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(Power, Patent No. [illegible])

As an operation lamp the above [illegible] suitable for ophthalmic work, as an [illegible] light of 40 c.p., without shadows, can be [illegible]

For examination of the fundus a filter [illegible]

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THE BRITISH JOURNAL

OF

OPHTHALMOLOGY

AUGUST, 1924

COMMUNICATIONS

A PLANE GLASS RETINOSCOPE

BY

F. A. WILLIAMSON-NOBLE

LONDON

THIS instrument has been designed with a view to the performance of retinoscopy at the macula in cases where a mydriatic has not been used. Such a procedure is not possible with the usual retinoscopy mirror on account of pupillary contraction, and the large size of the corneal reflex. One has to resort to some form of eccentric fixation on the part of the patient. A short description of this instrument has already been published. I have introduced several modifications and improvements.

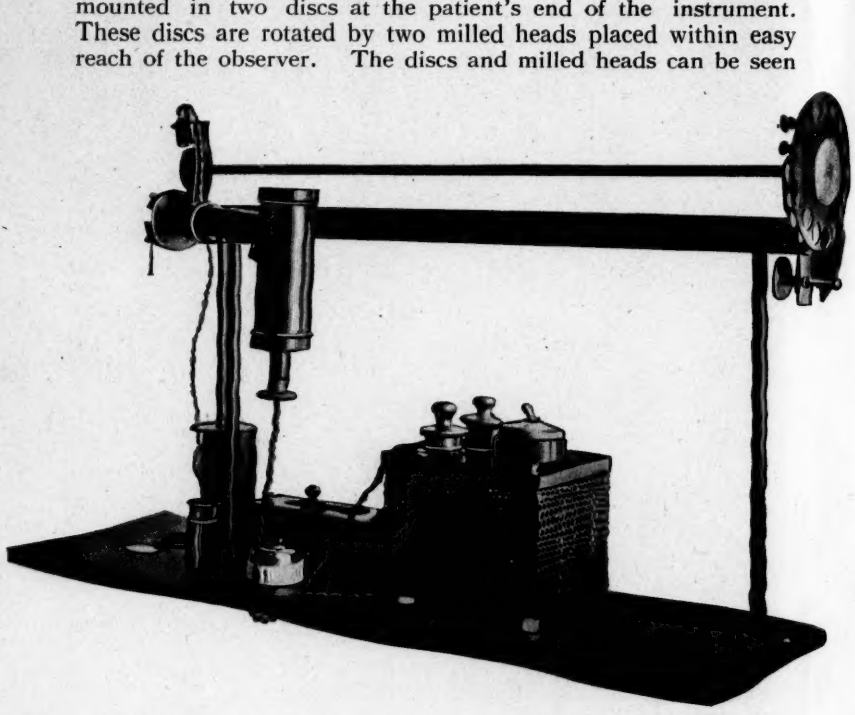
The optical system employed is shown in Fig. 1 (which is not drawn to scale).

A is the source of light, a 30 c.p. Pointolite lamp. B is a microscope condenser which forms a much reduced image of the source on a minute stop in the diaphragm C. D is a 5D convex lens placed 20 cm. from C converting the rays emerging from this point into a parallel beam. E is a thin piece of plane glass which reflects a portion of this light down the tube F into the patient's eye G.

The observer seated behind E and looking down the tube sees a yellow red reflex from the patient's pupil, and on moving his head from side will note a movement in the "shadow" similar to that seen in retinoscopy with a plane mirror, i.e., in hypermetropia,

and in myopia of less than 1D, the "shadow" appears to move across the patient's pupil in the same direction as that in which the observer moves his head, while in myopia of more than 1D the direction of the movement is reversed.

In order to facilitate lens changing, a series of lenses has been mounted in two discs at the patient's end of the instrument. These discs are rotated by two milled heads placed within easy reach of the observer. The discs and milled heads can be seen



in the photograph. There is also at the patient's end an adjustable ivory knob, which he is directed to place against his cheek so as to keep the eye at a constant distance from the plane of the lenses. The latter are tilted 10° from the vertical so as to prevent the observer seeing the reflection they form of the source of light. The astigmatism thus produced is so slight as to be almost negligible. When an 8D lens is tilted 10° the cylindrical correction is only 0.217D and with a 16D lens it is 0.49D. The effect can, therefore, be neglected as being within the limits of experimental error. Thus no light enters the observer's eye, except that from the patient's fundus, the reflection from the cornea being so minute as to be invisible.

The instrument is provided with several adjustments, but once set up there is no need to make any alterations. The lamp contained in a light-tight casing can be moved up and down, and from side to side, the same is true of the stop C, while the microscope condenser and the 5D lens can be moved backwards or forwards for focusing purposes. The plane glass is held in position by three adjustable screws, and can be tilted into the desired plane, so as to project the reflected beam of light straight down the tube to the patient's eye. At first sight it may seem a little odd for the observer to move his head rather than the plane glass; in practice, however,

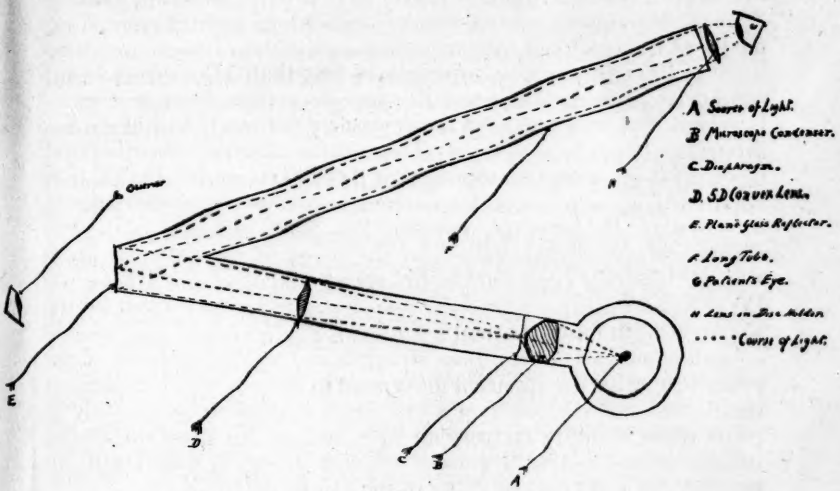


FIG. 1.

this method has been found to give better results than are obtained by tilting the glass.

In the usual performance of retinoscopy the observer automatically accommodates for the patient's pupil. With this instrument, however, the patient is in darkness, and there is no stenopaic effect such as is produced in the small hole in the usual retinoscopy mirror, hence one may not be accurately focused for the plane of the pupil. I have found that this makes a distinct difference in the values obtained. Thus, in my own case, using a Frost's model eye set at emmetropia, if I accommodate for the artificial pupil, neutralization is affected with a +1D sphere, if, however, I relax my accommodation and allow my hypermetropia (1D) to become manifest the outline of the artificial pupil of course becomes blurred, but it requires a + 1.50D sphere before neutralization is

effected. I, therefore, find that the most satisfactory results are obtained by adding +1D to one's distance correction, and by wearing this glass while using the instrument. The same thing occurs if one tilts the glass instead of moving one's head. It is impossible, however, to elicit the phenomenon using the ordinary retinoscopy mirror and a source of diffuse light either with the model eye or with a patient.

It is a little difficult to explain this phenomenon from the theoretical side and I only wish to make a tentative suggestion. It must depend on the use of a strictly parallel beam of rays. This will give a very small definite image on the fundus of the observed eye when it is emmetropic or nearly so. When this small, sharply defined, illuminated area of retina is viewed through the refracting media of the observed eye, it is seen as a virtual image, provided there is hypermetropia, or myopia of less than 1D. Now, in all conditions of refraction when the source of light (real or virtual) is moved, this area moves in the opposite direction, i.e. in the same direction as that in which the plane mirror is tilted. At the point of reversal one seems to lose sight of this image, and to see another apparently in the plane of the patient's pupil moving in the opposite direction. If, however, reversal has been obtained with the observer's eye accommodated for the plane of the patient's pupil and the observer then relaxes his accommodation and allows say 1D of hypermetropia to become manifest, the image formed by the source of light on the patient's fundus is again visible, and it takes a further increase in the plus strength of the lens in front of the patient's eye for the apparent movement to be reversed. Presumably this is because the observer's eye when hypermetropic is able to focus more strongly convergent rays and so can keep the virtual image of the patient's fundus in view when it would not be possible for a myopic or emmetropic eye to do so.

It should be stated that this effect is not so noticeable when a living eye is under examination as it is when the model eye is used, but it can be detected if carefully looked for, and if the observer deliberately relaxes his accommodation. If unrecognized it is a possible source of error, and it therefore seems better to wear a correction as already described. That it does not occur under the ordinary conditions of retinoscopy may be due to the fact that one is here dealing with a larger and more diffuse retinal image which is not so readily recognized by the observer's eye.

The instrument described has been made for me by Messrs. Dixey and Son, to whom I am much indebted for the care and trouble they have taken. It has given good results in practice, and its use effects a considerable saving of time.

A NOTE ON THE DOG'S TAPETUM IN EARLY LIFE*

BY

C. H. USHER

ABERDEEN

THIS note is written for the purpose of pointing out that the tapetum of the dog is not recognizable ophthalmoscopically for several weeks after birth, and that the early ophthalmoscopic appearances of the tapetum differ markedly from those seen in the adult animal.

A considerable search through ophthalmological and veterinary literature and conversation with some ophthalmologists, zoologists, and veterinary workers, has convinced me that these points are at least not generally known, though it seems unlikely that there is no record of them somewhere in literature.

The present observations were made on the eyes of puppies from ten different litters. In some cases only a single examination was made, in others an examination was made every week.

Observation 1. My attention was first drawn to the subject when making an ophthalmoscopical examination of the fundus of a five weeks old puppy, which to my surprise showed no evidence of a tapetum. When examined again at the age of ten weeks there was a well marked iridescent tapetum.

Observation 2. In a puppy from another litter no sign of a tapetum was present on the 20th, 38th, and 44th days after birth, but, on the 49th day there was a delicate diffuse purple in the tapetal area, most pronounced at its lowest part, though not sufficient to obscure the choroidal vessels. Two weeks later a green colouration was seen amongst the purple. By the 71st day the tapetum was markedly green resembling that of the adult dog and no choroidal vessels were visible at this region, whereas, by the end of the fifth week these vessels were as conspicuous in the tapetal area as they were in the lower part of the fundus.

Observation 3. Five liver and white pointer puppies were examined when three weeks old. Not one of the eyes showed any evidence of a tapetum. Two of the puppies, a male and a female, were re-examined on the 61st day and found to have a brilliant tapetum with purple predominating.

Observation 4. A second litter of five liver and white pointer puppies, four females and one male, examined on the 33rd day after birth showed no evidence of a tapetum in any of their eyes.

Observation 5. A litter of three male pointer puppies, one black

* Throughout this paper " tapetum " refers to the tapetum lucidum.

and white, the other two liver and white, showed no signs of a tapetum in any of the eyes on the 33rd day after birth.

Observation 6. A black and white pointer, aged 26 days, ophthalmoscopically showed no evidence of a tapetum. Left eye only examined.

Observation 7. An English setter, black and white, aged 35 days, showed no evidence of a tapetum.

Observation 8. Bulldog puppies, white and brindle, three females and and one male. No tapetum was visible in any of the eyes when examined on the 22nd and 29th days after birth. Thirty-six days after birth one bitch had no colour in the tapetum, and the other two bitches showed a very faint green tinge; the dog puppy had a distinctly green coloured tapetum. On the 50th day the tapetum was greenish blue in all of the eyes. The pupils were dilated by a mydriatic on each occasion.

Observation 9. A litter of three. (Dam a pomeranian probably not pure, sire pomeranian with some admixture of pekinese some generations before.) A, a female with dark brown coat. B, a male, coat colour same as that of A. C, a male, with white coat. No tapetum was found in any of them 22 and 29 days after birth. On the latter date puppy B was killed and one eye opened equatorially. The fundus macroscopically showed no sign of a tapetum, and the vitreous and lens were quite clear. Puppies A and C were re-examined on the 36th and 43rd days, when there was again no sign of tapetal colouring. On the 50th day, puppy A had just a suspicion of purple in the upper part of the fundus, and puppy C had marked patches of purple in the same region of each eye. There was no green or yellow colouring. Seven days later the purple was intense in the tapetum of puppy C, and though quite definite it was less brilliant in the tapetum of puppy A. By the 64th day there were bright green spots amongst the purple, and in places the purple had a redder appearance. These appearances were seen in the tapetum of both puppies. By the 71st day there was much more green in the tapetum, which was altogether more brilliant and its lower margin was better defined than it was one week before. In puppy C the green colour had replaced much of the purple colour. By the 99th day in each puppy the tapetum was brilliant green spotted with yellow. The upper parts were paler and presented more yellow colouration.

Observation 10. A Scottish terrier bitch mated with a black pomeranian dog had a litter of four. Puppy A, male, coat black. Puppy B, male, coat black with white spot on chest. Puppy C, male, coat black. Puppy D, female, coat black. Puppies A and B were examined 26 days, 33 days, and 40 days after birth. On none of these occasions was there any evidence of a tapetum in

the eyes of either puppy, the upper part of the fundus having the same appearance as the lower part. On the 47th day all the puppies were examined and in each case there was a marked purple colour at the tapetal region. No green had appeared excepting a single small spot in one of the eyes of puppy B. By the 54th day there was a considerable quantity of green amongst the purple in each of the eight eyes. On the 61st day the tapetum, in each of the four puppies, was still, in some parts, more purple than green, in other parts the green predominated. On the 75th day: in puppy A the tapetum was purple and green in equal quantities, each colour being arranged in small patches; there was no yellow. In puppy B, the tapetum was principally green with some yellow especially above, and there was a little purple anteriorly. In puppy C, the tapetum was mostly green with some purple, and in puppy D, the tapetum had rather more green than purple, but there was no yellow in either. The last examination was made on the 89th day, when in all of the puppies the tapetum was brilliant green with small yellow spots, which in puppies A and D were scanty and very small. At the edge of the tapetum was some purple. The examinations were made with pupils dilated by homatropin, and an oil lamp was used.

As regards the length of time that elapses, from the date of birth, before the tapetum begins to assume its brilliant colouration it will be seen that an ophthalmoscopic examination of the eyes of 17 puppies in their fifth week showed no evidence of a tapetum, and in eight puppies examined before the fifth week no tapetum could be seen. For the purpose of determining when the tapetum first becomes recognizable only four of the observations are available, namely, 2, 8, 9, and 10. In observation 2, signs of the tapetum were seen on the 49th day. These were not present five days earlier. In observation 9, the first signs were seen on the 50th day. These were not present one week earlier. In observation 10, the first signs were seen on the 47th day. These signs were not present one week earlier. In these three litters then, the colouring of the tapetum in the seven puppies' eyes was visible for the first time from the 47th day to the 50th day, and in two of these litters (observations 2 and 9) it certainly was not present before the seventh week, and in the third litter (observation 10) before the 40th day. The onset of the colouration in (observation 8) the bulldog puppies, occurred earlier, namely, at the beginning of the sixth week, for three of the four puppies showed a faint green in the tapetal region on the 36th day. No colouration had been observed one week earlier. The early colouring was different in this litter from that in other litters, but it is possible that purple had appeared and had been replaced by green, within a week, during which time no examination was made.

The earliest colour to appear in the tapetum, as seen from these observations, is a beautiful purple which before long is gradually replaced by a brilliant pale green in which, later, spots of yellow develop. The margin of the tapetum remains purple. It may be that the above sequence of colours varies to some extent in different breeds as the litter of bulldog puppies suggests, in which the first colour seen was pale green.

A short account of what obtains in the case of the cat's tapetum is here added. In 1871, Schultze[1] recorded absence of metallic lustre in the choroid of the cat two weeks after birth. In 1884, Hilbert[2] examined a kitten's fundus ophthalmoscopically at frequent intervals. His description appears to be the only account of the early ophthalmoscopic appearances of the tapetum in the cat, and is founded on the examination of a single kitten. He found that a yellow colouration preceded the subsequent blue and violet.

The tapetum of the cat resembles that of the dog in that there is no ophthalmoscopic evidence of its presence during the first few weeks of life, and in that the green colour of the tapetum of the adult cat is preceded by a diffuse purple colouration of the whole of the tapetum. These remarks are based on the examination of kittens from four litters.

(1) A black female kitten examined when 14 days and again when 16 days old showed a uniform grey appearance of the fundus with no difference at the tapetal region. There was no red, blue, yellow, green or purple colouration. There was no change in the appearance of the fundus on the 27th day and 36th day. Unfortunately, the kitten died on the 40th day. Another black coated kitten from the same litter on the 48th day had a brilliant green, yellow, and purple tapetum in each eye.

(2) Two black kittens, a male and a female, from the same litter, were examined on the 32nd day after birth. All the eyes presented a diffuse delicate purple colour in the upper part of the fundus. The lower part of the fundus did not show a good red colour, but had rather a greyish aspect. On the 46th day the colouring of the tapetum was more pronounced. The deepest purple was at its lower edge, whereas above, the tapetum became very pale with a tinge of green. The fundus below was dark red. The female kitten at the end of six months had a brilliant green tapetum.

(3) Two female kittens from the same litter, one with a yellow coat, the other with a brown and black tigroid coat, were examined on the 25th day after birth, when no evidence of a tapetum was present. The whole fundus had a reddish grey aspect. On the 29th day there was a distinct diffuse purple over the tapetum in all of the eyes. Some redness was seen at the lower part of the

fundus. On the 39th day the tapetum had a brilliant purple colour becoming fainter, almost white, above. No green colour was found in any of the eyes. On the 46th day, there was green colouration of much of the tapetum. Purple was marked at the lower edge. On the 60th day the tapetum was pale green except at the edge where there was a narrow zone of purple. The lower part of the fundus was brownish red.

(4) Three kittens from the same litter. Iris greenish blue in all. First examination on the 30th day. A, a grey-coated, male kitten. The fundus had a grey appearance, and the lower part had the same appearance as the tapetal portion on indirect examination, but, on direct examination a faint tinge of purple was detected in the tapetum, mostly at the upper part. B, a black-coated, female kitten. The merest trace of purple could be detected, chiefly at the upper part of the tapetum. C, a black-coated female kitten, with a tapetum resembling that in kitten B. On the 38th day, the three kittens showed very marked purple colouration of the tapetum, especially at the lower part. The upper part was paler. The fundus below the tapetum was grey with a tinge of red. On the 48th day the tapetum of each kitten had a brilliant green colour like that seen in X-ray tubes, but the lower part showed much purple. The examinations were made after the use of a mydriatic, and an oil lamp was used.

In comparing these results with what was found in the puppies, it would appear that generally the colour of the tapetum is later in appearing in the dog than in the cat. In three of the cat litters purple was observed from the 29th day to the 32nd day, in the remaining litter there was no colouration on the 36th day, whereas in the dog the earliest appearance of colour was on the 36th day, namely, one week later than the earliest occurrence in the kittens, and the more usual date in the dog was from the 47th to the 50th day, that is, more than two weeks later than in the kittens. Without exception, purple was the first distinctive tapetal colour to appear in the kitten.

The correlation of these early ophthalmoscopic appearances of the tapetum with the histological changes that occur in the iridocytes, as described by Schultze and others, is of interest, but, the subject is outwith the scope of this note.

REFERENCES

1. **Schultze, M.**—"Ueber das Tapetum in der Chorioides der Raubthiere." *Sitzungsberichte der Niederrheinischen Gesellsch. f. Natur und Heilkunde, Nachtrag zum Bericht über der Sitzung*, von November 27, 1871. Original not seen. *Ref. Nagel's Jahresbericht*, p. 45, 1871.

2. **Hilbert, Richard.**—"Ueber die nach der Geburt eintretenden entwickelungsgeschichtlichen Veränderungen der brechenden Medien und des Augenhintergrundes der Katze." *Arch. f. Ophthal.*, Vol. XXX, No. 3, p. 245, 1884.

ON PROGRESSIVE ATROPHY OF THE IRIS WITH FORMATION OF HOLES AND GLAUCOMA

BY

PROFESSOR G. F. ROCHAT and DR. W. MULDER

GRONINGEN DURBAN, S.A.

IN the literature can be found a small number of cases of atrophy and formation of holes in the iris without any apparent cause. As far as one can judge from the description of these few cases, the majority of which have only been observed in an advanced stage, and could not be examined at distant intervals, there can be no question of congenital malformations. The condition is progressive, so that very large defects in the iris can develop in the course of time. The pupil, even if the greater part of the iris has vanished, remains intact, but in almost all the cases is considerably displaced towards the periphery. In most of the cases on record, glaucoma was observed.

Our knowledge of this remarkable disease is extremely imperfect, firstly, because of its infrequency, but also because its very slow course and the absence of pain do not force the patient to consult the oculist. The disease is, therefore, either casually discovered during an examination for some other complaint, or seen in its last stage, when glaucoma drives the patient to the consulting room. It is very seldom that one has the occasion to see the patient for a long period and still more seldom to make a microscopical examination. As far I am aware this latter has been made only by Bentzen and Leber, Casey Wood, and Licsko. Their results are mainly the same. In all cases the eyes had been removed for absolute glaucoma. No signs of any inflammatory disease were found; the periphery of the iris was firmly adherent to the cornea, and the still existing parts of the iris were atrophic. Licsko attributes the glaucoma to the dissemination of the pigment from the atrophic iris (*Pigment-zerstäubung*), but partly also to the atrophy of the iris-tissue by which the surface available for the resorption of the intraocular fluid must be considerably diminished (according to the theory of C. Hamburger).

It is apparent that hitherto the most important facts about this disease are insufficiently known. In the first place: is the atrophy of the iris primary and the glaucoma secondary to it, or is the atrophic condition of the iris the result of a very slow running glaucoma? Benzen and Leber were partisans of the first opinion, most authors of later years are inclined to think that at the beginning there is no glaucoma, without being able to give decisive proof.

Secondly, what is the cause of the very striking eccentricity

of the pupil? It may be the result of a circumscribed shrinking of the iris by some pathological process, in which case the atrophy of the other parts of the iris might be considered to be the consequence of the constant hyperextension of these parts; but it might be just as well explained by assuming a primary atrophy of the iris, in which case the pupil would naturally be drawn to the side where the iris is less atrophic, simply as the result of a disturbance of the equilibrium.

In the following case, which was examined first at the very beginning, accurate and complete notes being taken at that time, and later in an advanced stage, and of which a microscopic examination was made, we were able to ascertain exactly the order in which the different changes took place, and thus to give the answer to the questions mentioned above. The patient was seen by Dr. W. Mulder at Durban for the first time in May, 1917.

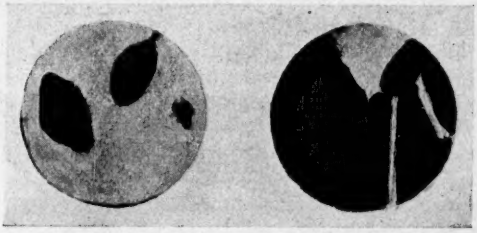


FIG. 1. May 25, 1917. FIG. 2. May 22, 1923.

Progressive atrophy and hole formation of the iris. Displacement of pupil and ectropion uveae already marked in Fig. 1.

She was then 41 years old, healthy in every respect, except for a light degree of struma, and mother of two healthy children. The Wassermann reaction was negative. She only complained of some fatigue of the eyes, and in a casual way mentioned that the left eye had appeared strange lately and was a little sensitive in sunlight. No accident of any kind had ever happened to this eye. The eye was found normal in every respect; vision 6/6; refraction emmetropic; tension normal; no restriction of the field of vision; fundus normal. Only there was a marked displacement of the pupil towards the temporal side and a little up (Fig. 1). The corresponding part of the stroma had almost disappeared and the everted pigment layer was visible at the temporal side of the pupil as a black line disappearing behind the limbus. On the opposite side, the stroma of the iris was rarefied and at the nasal side there was a complete hole, forming a vertical ellipse, at the bottom of which two streaks of the pigment layer were still present. Laterally and a little below the pupil there was a small defect of the superficial layer of the iris where the uvea lay exposed.

This case is the first in which a complete examination for glaucoma was made at an early stage. There can be no doubt that the eye was functionally normal at a time when there already existed a marked degree of atrophy of the iris and hole formation. The latter are therefore the primary affections.

In May, 1923, the patient returned because the eye had become troublesome and sight had gone. There was hardly anything left of the iris (Fig. 2). The pupil was still more pulled towards the periphery; above there remained a triangular piece of nearly normal iris; the entire nasal half of the iris was occupied by a large hole

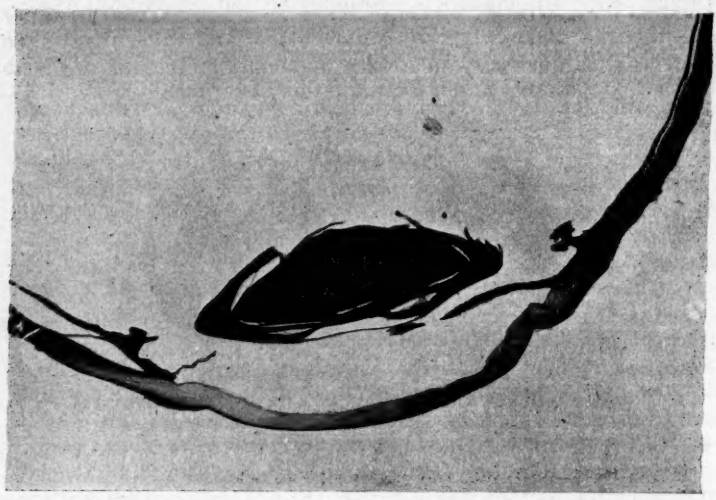


FIG. 3.

Progressive atrophy and hole formation of the iris. Horizontal Section through the largest hole and front of the pupil.

and in the lower part a portion of the pigment layer still existed on which a few narrow streaks of the anterior layer ran in a vertical direction. The eye was painful and blind, the tension +2, and a deep excavation of the disc was visible. There were no signs of inflammation. The eye was enucleated and sent to Professor Rochat for examination. Microscopically (Fig. 3) the root of the iris was found adherent to the periphery of the cornea in its entire circumference. In the region of the large nasal hole the iris was torn off very near to this adherent portion and in such a way that a broad flap of pigment layer was left attached to the stump floating in the anterior chamber with its free end. In other parts the

pigment layer was completely torn off together with the stroma of the iris. The peripheral synechia was most developed in the region where the pupil was pulled over to the limbus. In this part, the tissue of the iris firmly attached to the cornea in the angle of the anterior chamber was not rarefied as in other parts, but, on the contrary, was more compact. A new tissue had formed in the angle of the anterior chamber containing many oblong cells with their nuclei parallel to the layers of the cornea. This accumulation of cells was in some spots so abundant that it almost resembled a small sarcoma of the iris-root. The surface of the iris itself in the region of the displaced pupil was covered with a thin layer of the same tissue and over this a hyaloid membrane had formed, carrying a regular layer of endothelium, which could be followed continuously into the endothelium of Descemet's membrane. The posterior layer of the iris, at the place where the pupil is drawn nearest to the limbus, was drawn over to the anterior surface in the form of an ectropion uveae. The small portion of still existing iris was fairly well preserved. There were no undoubted signs of a pre-existing inflammation of the iris, either in the form of a cellular infiltration, or of posterior synechiae, but on the posterior surface of the cornea were a few clusters of cells, carrying uveal pigment. These deposits on Descemet's membrane had not been detected during life; they were not visible with ordinary focal illumination. In the space between the flat part of the ciliary body and the limiting membrane of the vitreous were a few leucocytes charged with pigment and also some red blood corpuscles, probably derived from a small haemorrhage in the retina. The retina was much atrophied in its anterior part but showed no further remarkable changes, nor did the choroid. There were undoubtedly a few signs of a slight recent inflammation, but, as these may be found in the same degree in every case of advanced glaucoma, it is very doubtful if they have any relation to the atrophy of the iris. This is the more improbable, because of the complete lack of signs of recent inflammation in the iris proper.

From the clinical data of this case we can conclude with certainty that the marked degree of atrophy, resulting in the formation of a hole in the iris, of Fig. 1, already existed before a trace of glaucoma could be detected. Leber and Bentzen's opinion that glaucoma might be the cause of the atrophy of the iris in these cases cannot be sustained.

In the second place this case shows clearly that the displacement of the pupil cannot be the effect of a primary atrophy of some adjacent part of the iris, for though at the time of the first examination the hole in the iris was not very large, the pupil was already markedly pulled to one side and there was a visible ectropion uveae in the corresponding region to explain this condition.

From pathological examination as well as from the clinical data one gets the impression that the principal factor in the process is the soldering together of the root of the iris with the periphery of the cornea beginning at a circumscribed spot and leading to displacement of the pupil. In a second stage the pulling over of the iris causes distension of the anterior layer of the opposite part, resulting in atrophy, and, finally, tearing of the stroma, alone or together with the pigment layer. The appearance of the holes is the most conspicuous symptom of the disease, and, therefore, first detected. The slowly progressing obliteration of the angle of the anterior chamber, when completed, causes the final stage in which glaucoma destroys the vision.

In the present case the microscopic examination gives no definite clue to the cause of the circumscribed obliteration of the angle of the anterior chamber. It is, of course, very probable that the newly formed compact tissue, the shrinking of which causes the obliteration of the angle in the affected area, is the result of some inflammatory process. But neither clinical nor pathological examination showed definite symptoms of such a process. It is not altogether improbable that, if one could examine a case in a still earlier stage with slit-lamp and high magnification one might succeed in detecting such symptoms. In this relation it may be emphasized that de la Vega observed hole formation in the iris subsequent to a syphilitic infection. It is true that in this case no inflammation of the anterior parts could be detected clinically, but there existed an old retino-choroiditis peripherica. Also in a case described by Harms in which, however, glaucoma was present, fine deposits on the posterior surface of the cornea were found that might possibly be interpreted as signs of inflammation.

As there is but little chance that anyone should get an opportunity to make a microscopical examination of a case at the very beginning, this point will probably not be elucidated in the near future.

LITERATURE

1. **Arnold.**—"Ein neuer Fall von fortschreitender Irisatrophie mit Lueckenbildung." *"Klin. Monatsbl. f. Augenheilk.*, p. 724, 1923.
2. **Licsko.**—"Durch Irisatrophie hervorgerufenes Glaucom." *Ibidem*, p. 456, 1923.
3. **Larsson.**—"Zur Kenntniss der erworbenen Irisatrophie." *Ibidem*, p. 510, 1920.
4. **de la Vega.**—"Fortschreitende Atrophie der nicht entzuendeten Iris nach Chorio-retinitis syphilitica." *Ibidem*, p. 44, 1923.
5. **Casey Wood.**—"Progressive primary atrophy and almost complete disappearance of the right iris." *Ophthalmoscope*, p. 858, 1910.
6. **Lane.**—"Primary progressive atrophy of the iris." *Ophthal. Record*, 1917.
7. **Harms.**—"Spontane Lueckenbildung der Iris ohne mechanische Zerrung." *Klin. Monatsbl. f. Augenheilk.*, p. 522, 1903.
8. **Bentzen and Leber.**—"Ueber Filtration aus der vorderen Kammer, etc." *Arch. f. Ophthal.*, 41, 3, p. 229, (Versuch VI.)

A CASE OF UNIOCULAR PARALYSIS OF THE ACCOMMODATION

BY

DR. H. J. FLIERINGA

ROTTERDAM

TOWARDS the end of June, 1923, a child, ten years of age, was brought to see me by her mother, acting on the advice of her school teacher, to see if a sudden recent marked deterioration in her writing might be due to some ocular defect. Specimen writing from her copy-book showed an extraordinary change in two or three days. No history of recent illness was obtainable on first inquiry.

Examination of the eyes gave the following result:

The pupils were equal and reacted normally to light and convergence. There was no paresis of any of the external ocular muscles and the fundus oculi was normal. The refraction of both eyes was emmetropic and the binocular vision as well as the vision of each eye separately was 10/10. Binocularly Snellen 0.5 could be read fluently at 15 cm. When, however, the near vision of each eye was tested separately it was found that while the left eye could now read the same type at 7.5 cm., thus possessing an accommodation of 13 dioptres, the right eye could not read the small type at all and appeared to possess an accommodative power of only 1.5 dioptres.

The explanation of the bad writing is evidently the uniocular paralysis of the accommodation. A child, when writing, and especially when writing obliquely, tends to hold the head very much to one side, so that in the case of right-handed children, the right eye is nearer to the paper than the left one. In fixing an object in the median plane we naturally accommodate most exactly with the eye that is nearest the point of fixation so that in writing the "leading eye," in this case the right one, has done the main part of the work. Unequal accommodation does not seem to occur under normal conditions. If in this child the right eye is closed and the head is turned to the right, writing becomes once more normal. Doubtless, if the paralysis had persisted, the child would have learned to use the left eye as the "leading eye."

A point of interest in the near vision tests is the fact that while Snellen 0.5 can be read at 15 cm. with both eyes uncovered, it cannot be read at 50 cm. until the right eye has been occluded. This, I consider, must be due to the fact that at the greater distance the difference between the accommodation of the

two eyes is less marked as is also the difference between the sharpness of the two ocular images. Consequently the hazy vision of the right eye will cause more inconvenience at a great distance than at a short one. At a short distance the image of the right eye will be so hazy that, psychically, it may be eliminated. No divergence was observed.

On further pressure the mother recollected that the child had been kept in bed for a few days with fever and sore throat some six weeks previously. The doctor in attendance had taken a swab but failed to find any diphtheria bacilli. In spite of this one negative result I am convinced that the patient had suffered from a mild attack of diphtheria, all the more so as I saw another girl

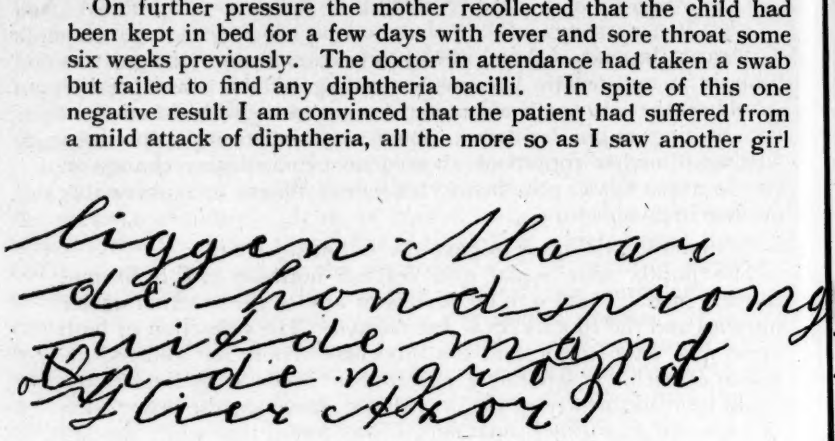


FIG. 1.

Writing during paralysis.

from the same neighbourhood a few days later with binocular paralysis of the accommodation following a sore throat.

The diagnosis was rendered a little difficult by the absence of any of the more usual forms of post-diphtheritic paralysis, by the affection—possibly only apparently—being confined to one eye, and by the normal distant vision, owing to the fact that there was no error of refraction.

Normal pupil reactions are the rule in post-diphtheritic paralysis but cases of diminished reflex to light (Scheby-Buch[1], Moll[2], Weber[3], Schmidt-Rimpler[4] and to convergence (Aubertin[5], Lohmann[6], Stephenson[7]) have been recorded.

Groenouw, writing in Graefe-Saemisch, says that both eyes are always affected, and Remak[8] records 100 cases without a single uniocular paralysis.

In spite of these observations and the fact that the punctum proximum of the left eye, in the case here recorded, was at 7.5 cm. (an accommodation of 13 dioptres), which corresponds with the well-known curve of Donders, I still consider that the affection

was of a post-diphtheritic nature. In a recent paper, written in collaboration with Professor van der Hoeve[9] (*Brit. Jl. of Ophthal.*, March, 1924), on the study of accommodation, we have endeavoured to show that the normal ciliary muscle is able to produce a greater force than is necessary for maximum accommodation, that is to say, that the total strength of the ciliary muscle in myodioptres is greater than the number of dioptres in maximum accommodation. The older the person the greater the difference between these two values. We found in examining the total strength of the ciliary muscle values as high as or even higher than 20 myodioptres. If we accept such a value for the ciliary muscle in this patient, it is obvious that the total strength of the muscle may have been reduced by 7 myodioptres without any effect on the punctum proximum. Thus, as I suppose to have been the case in my

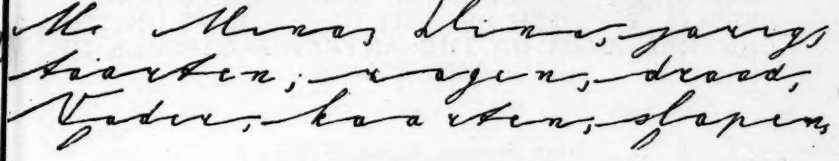


FIG. 2.

Normal writing.

patient, we may have uniocular paralysis of accommodation as found by measurement of the near-point, but a binocular affection of the ciliary muscle, provided that the amount of paralysis was not sufficient in one eye to affect the position of the near-point. A case of Wiegmann's[10], a boy, 12 years old, well illustrates the different degree in which the diphtheria toxin may affect the two eyes. The post-diphtheritic paralysis in this case was obvious three years after infection in the right eye but had completely disappeared in the left.

I think the possibility that the left eye had been affected earlier and had recovered when I first saw the child may be excluded as reading had not been affected.

The fact that the right eye should have been affected may possibly be explained on Edinger's[11] statement that a toxic paralysis prefers to manifest itself in that region of a nerve path in which most work is done, as the right eye is more used than the left in right-handed persons. On the other hand the accommodative work is always the same in both eyes.

The subsequent history of my case was the usual one in post-diphtheritic paralysis. The accommodation was restored after

about six weeks and the punctum proximum of both eyes was then found to be 7 cm. The writing is now quite normal again.

BIBLIOGRAPHY

1. **Scheby-Buch.**—*Arch. f. Ophthal.*, p. 265, 1871.
2. **Moll.**—*Centralbl. f. prakt Augenheilk*, p. 2, 1896.
3. **Weber.**—*Virchow's Arch.*, Vol. XXV, p. 114b, and Vol. XXVIII, p. 489, 1863.
4. **Schmidt-Rimpler.**—*Klin. Wochenschr.*, p. 92, 1884. Berlin.
5. **Aubertin.**—*Rev. Gén. d'Ophtal.*, p. 280, 1903.
6. **Lohmann.**—*Bericht über d. Vers. d. Ophthal. Gesellsch.*, p. 264, 1908. Heidelberg.
7. **Stephenson.** – *The Ophthalmoscope*, p. 13, 1910.
8. **Remak.**—*Centralbl. f. prakt. Augenheilk.*, p. 161, 1886.
9. **van der Hoeve.** – *Brit. Jl. of Ophthal.*, March, 1924.
10. **Wiegmann.**—*Klin. Monatsbl. f. Augenheilk.*, p. 161, 1886.
11. **Edinger.**—*Deutsche med. Wochenschr.*, 1904 and 1905.

CASE OF SUPERFICIAL AND DEEP LENS CHANGES, ASSOCIATED WITH DEPOSIT OF PIGMENT ON THE CENTRAL AREA OF THE ANTERIOR CAPSULE OF THE LENS

BY

JOHN FOSTER, F.R.C.S.(Edin.)

WEST HARTLEPOOL

MY excuse, if one be deemed necessary for reporting this case, is, that it is well known that there is a dearth of references in the matter of congenital abnormalities of the pupillary area. Probably, however, I should not have taken further note of this case, had I not seen, in this journal for June, 1922, a description of seven similar cases by Dr. Ernest Thomson. Anyone interested in this class of case would naturally refer to Dr. Thomson's paper, where the subject is well discussed, with opinions of several leaders in ophthalmology. Many references are given, British, American, and Continental; to these I have nothing to add.

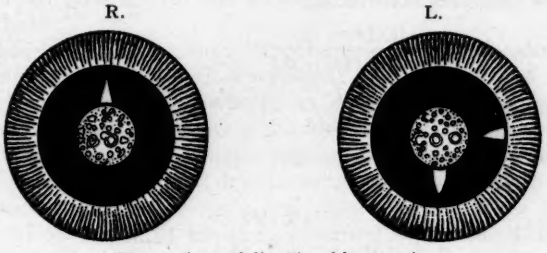
Notes of my case

Dorothy M., 12 years of age, sent to the town ophthalmic clinic on account of defective sight. Record of vision: R.V.=6/18 ^{2}; L.V.=6/18 ^{3}; no glass helped. Date January 10, 1922.

Condition under Atropin. Right Eye.—The central area of the pupil is occupied by an almost circular mass of brown pigment with two holes, below the centre, which the sketch shows; the rest of the pupillary area is normal and the edge of the iris is free from any abnormality whatever. Superior to the circular pigment mass, is a whitish radial spoke, sharply defined, with pointed end upwards, it is clearly subcapsular.

Left Eye.—The condition, as regards pigment, is practically the same as in the right eye; the difference lies in the lens changes, the radial spoke is below the pigment mass, subcapsular clearly, and in addition there is temporally to the pigment another spoke, whitish and similar in shape to the others, but deeply placed in the lens.

General Remarks.—The case whilst differing from Dr. Thomson's cases is, to my mind, quite definitely of the same type; it is



The pupils are fully dilated by atropin.

the only one I have met, out of 3,000 cases examined at the clinic.

History.—The family and personal history is good. No history or sign of syphilis can be found, or history of eye trouble or treatment to the eyes at all. The parents, respectable hard-working people, with a family of ten, were aware that the child had not quite good sight, but did not think there was any need for treatment. With the appearances and the history, the fairest conclusion it is natural to arrive at is, that the case is one of congenital abnormality, quite unconnected with either pre- or post-natal inflammation.

PRESCRIBING SPECTACLES

BY

A. S. PERCIVAL

NEWCASTLE-UPON-TYNE.

SINCE writing my short paper on this subject which appeared in May, I have found that the expression for the *back focal distance* (BFD) can be much more simply expressed in the dioptric form.

Let the metre be taken as the unit, and let D be the power required. Then the thickness t or 3.8 mm. is written 0.0038 m. and D becomes $\sim \frac{1}{BFD,}$ and if d_1 denote the power of the anterior

surface, and d_2 the power of the posterior or ocular surface of the meniscus, we have $f_1'' = -\frac{\mu}{d_1}$ and $\frac{1}{f_2''} = -d_2$,

$$\text{so } x \text{ or } t - \frac{\mu}{d_1} = \frac{-\mu}{D - d_2}$$

$$\therefore \frac{1}{D - d_2} = \frac{1}{d_1} - \frac{t}{\mu}$$

This is the general formula:

$$\text{hence } d = \frac{\mu (D - d_2)}{\mu + t (D - d_2)}$$

$$\text{and } d_2 = D - \frac{\mu d_1}{\mu - td}$$

In the example on page 231 where d_1 is required, $D = 6$, $d_2 = -7$, so $D - d_2 = 13$

$$\therefore d_1 = \frac{13\mu}{\mu + 13t} = \frac{19.799}{1.5724} = 12.59$$

Of course + 12.5 D would be ordered.

On page 232 the prescription is written for a + 9D base, and we wish to find d_2. Taking $D = 3.5$ and $d_1 = 9$ we find

$$d_2 = 3.5 - \frac{13.707}{1.4888} = 3.5 - 9.2067$$

$\therefore d_2 = -5.7067$, and -5.75 is ordered.

If the other meridian were considered even − 6D might be ordered, for $D = 7$ and $d_1 = 12.5$.

$$\therefore d_2 = 7 - \frac{19.0375}{1.4755} = 7 - 12.9 = -5.9$$

This ambiguity about the value of d_2 will always occur when a convex toric surface is ordered, but when a concave base is ordered, the value of the anterior surface d_1 is always defined.

Thus for case (2) where the same spherocylinder is ordered on a − 6D base, we must find d_1. But here for one meridian we have $D = 3.5$ and $d_2 = -9.5$ and $D - d_2 = 13$; for the other meridian we have $D = 7$ and $d_2 = -6$ and again $D - d_2 = 13$

$$\therefore d_1 = \frac{\mu (D - d_2)}{\mu + t (D - d_2)} = \frac{13\mu}{\mu + 13t} = \frac{19.799}{1.5724} = 12.59$$

for both meridians.

Consequently the anterior surface should be of the power + 12.5D. It will often be found that this attention to the position of the second principal point makes all the difference to the comfort of the patient, and frequently, but I fear not always, does away with the curved appearance of the objects viewed.

SOCIÉTÉ FRANÇAISE D'OPHTALMOLOGIE*

THE Annual Congress of the Society was held in Paris from May 12 to 15; the attendance was large and the success of the meeting was enhanced by an address by Dr. de Schweinitz, the ex-President of the Ophthalmological Congress of Washington, whose subject was: "Certain ocular manifestations of focal infection, excluding those commonly attributed to this etiological factor." An abstract of this address will be published later in this journal.

The subject of discussion: "Ocular lesions of dental origin," was introduced by Dr. C. Fromaget, in a long and clearly-expressed communication, which, as usual, had been previously circulated. He laid stress upon the less frequent but more serious orbital complications, in which cellulitis was sometimes followed by meningitis, infection and destruction of the globe. Although the ocular lesions of dental origin are apparently not very frequent they should be constantly borne in mind and this source of infection investigated. It is not sufficient to show that the patient's oral condition is unhealthy; not only the concomitance of oral sepsis and ocular lesions must be established, but their relation as cause and effect. The absolute necessity of X-ray examination in this class of case was emphasized by Fromaget and speakers in the discussion.

The papers presented to the Meeting numbered over 40; brief notes of some of these are appended.

Gallemaerts (Brussels). A case of anophthalmos, in a child dead at three months. There was a total absence of optic nerves, chiasma, third and fourth nerves. In the right orbit serial sections revealed a rudimentary eye, represented by a collection of pigmented cells in a fibrous capsule. In the left orbit no trace of an eye. The writer thinks that syphilis plays an important rôle in the production of congenital ocular anomalies.

Dupuy-Dutemps (Paris) presented statistics of 290 cases treated by dacryocysto-rhinostomy, showing 92.3 per cent. complete cures, 4.3 per cent partial cures, 3.3 per cent failures. He thinks extirpation of the lacrymal sac should now be banished from methods of treatment.

Morax (Paris) reported two cases of conjunctivitis with moderate muco-purulent discharge, in which the micrococcus catarrhalis was the active agent.

Jacqueau and Bujadoux (Lyons). Epibulbar benign tumours with multiple recurrences; this case occurred in a woman, in whom for nine years a series of small pinkish white growths of soft consistence and feebly adherent to the sclera, appeared and

* From a report by Dr. G. Cousin, *La Presse Medicale*, 31 Mai, 1924

reappeared locally in spite of cauterizations and X-ray treatment. Histologically, the growths were considered to be a form of keratosis.

Duverger and Lampert (Strasbourg) gave a further report of their researches with the corneal microscope in parenchymatous keratitis showing that deep vascularization, visible only with the microscope, is indicative of syphilitic origin and enables a diagnosis to be made between keratitis of traumatic origin and that due to congenital syphilis.

Truc and Dejean (Montpellier) reported a case of annular irido-ciliary sarcoma.

Rochon-Duvigneaud (Paris) read a paper on the value of a large capsulectomy in cataract extraction. He prefers Kalt's forceps with toothless blades for the purpose.

Lagrange and Beauvieux (Bordeaux) demonstrated that the vascularization of the cribriform lamina is derived from the arterial circle and not from the central retinal artery, and that glaucomatous changes in the lamina begin as lacunae, which by subsequent union give rise to the characteristic excavation.

Coppez and Danis (Brussels) read a paper on "Early objective and subjective symptoms of senile macular exudative retinitis." The first subjective evidence is a positive central scotoma, rapidly progressive, while the ophthalmoscopic lesions are scarcely visible; at a later stage the retinal lesions are obvious and characteristic, as previously described by the authors.

Onfray (Paris) recorded a case under his observation, of a young female, whose grandparents were general paralytics, and whose family had all been examined serologically. The patient was affected by macular choroido-retinitis and was "without doubt" an instance of inherited syphilis in the second generation.

Worms and Pesme (Paris) in a paper on the ocular complications of malaria, reported two cases of optic nerve atrophy (one of retro-ocular neuritis, one of ophthalmoplegia with optic neuritis), which they consider were undoubtedly of malarial origin. They believe that syphilis and alcoholism have frequently been accepted as the cause of optic neuritis or ocular palsies, which were in reality of malarial origin.

Bourguet (Paris) reported a case of bilateral papillary stasis treated successfully by puncture of the third ventricle through the corpus callosum. In view of this good result he advocates this plan of treatment before resorting to trephining.

Villard (Montpellier). The treatment of hypophyseal lesions by deep radiotherapy. Villard's case while under treatment lost his headache, regained some acuity of vision and extension of field in the right eye. There was, however, no improvement in the left eye, and no change in the adipose and genital conditions.

Vedjowski (Brno) reported his experience in the treatment of syphilitic ocular lesions by bismuth salts. He obtained good results in acute iritis, ophthalmoplegia interna and fundus lesions; in interstitial keratitis bismuth salts showed no superiority over older remedies.

ANNOTATIONS

The National Physical Laboratory

Through the courtesy of the Directors of the National Physical Laboratory the editors of this journal were able to be present at the inspection by the General Board on June 24. Although most of the routine optical work is done elsewhere some very interesting optical experimental work, as well as the testing of sextants and photographic lenses, is carried out at Teddington. For this purpose a constant temperature room, the cooling or heating of which is brought into play automatically by an electrical thermometer consisting of a fine grid of wires a little below the ceiling which is sensitive to 1/100th of a degree C. is provided. A series of experiments with a trichromatic colorimeter are being made with the view of setting up a series of colour standards expressed in terms of the eye. It is hoped that this will enable any colour to be expressed with absolute precision simply by quoting a reference number. We were very much impressed by a new form of flicker photometer in which measurements of extreme accuracy could be taken with great ease and rapidity. Unfortunately, it is not suitable for very low grades of illumination such as prevail in coal mines.

Outside the optical section there were many features of interest, notably the William Froude National Tank for the experimental working out of ship and propeller designs and the standard leading screw lathe. We are in sympathy with the opinion that has been frequently expressed that every ophthalmic surgeon should have a course of practical instruction in accurate physical measurement in a physical laboratory, and so acquire some idea of the practical difficulties that have to be met. We should not then meet with such farcical spectacle prescriptions as a cylinder of an eighth of a dioptre set at an angle of two and a half degrees, to take an extreme case once shown us by a patient.

Science and the Lay Public

The educated lay public in France is certainly better supplied with scientific papers in the Revue des Deux Mondes than is the British reader by any of his magazines of similar standing.

Possibly by training and mentality it is better able to appreciate scientific ideals, as such articles as some that have recently appeared would not be published in the absence of some demand. In the number for January 1 of the present year Emile Picard contributes an excellent paper on the theories of light and ether, which would probably convey some fresh information even to ophthalmic surgeons. Nordmann, the well-known astronomer, contributes a regular article once a month, dealing, and by no means always in an elementary fashion, with some scientific topic of current interest. Other scientific men of eminence in their own special lines also contribute from time to time. Possibly something of the same sort might prove successful in this country, and would, at any rate, provide some variation on the everlasting political papers, few of which show any evidence of scientific mentality, that fill the pages of our more serious monthly and quarterly journals.

ABSTRACTS

I.—TREATMENT

(1) **Pollock, W. B. I. (Glasgow).—The treatment of early opacities in the senile lens, with demonstration of six cases.** *Glasgow Med. Jl.*, January, 1923.

(1) **Pollock**, who has already written two articles on the subject of the medicinal treatment of cataract (*Trans. Ophthal. Soc.*, 1915 and *Glasgow Med. Jl.*, October, 1917), in the present article gives, in the first place, a comprehensive review of the very considerable literature on the subject, and, in the second place, an account of six cases treated by what has been called the alkaline method. It will be convenient to give Pollock's conclusions first, since a very considerable amount of scepticism exists as to the possibility of curing cataract by this method.

"(1) Nearly all ophthalmic surgeons have seen at times traumatic cataract absorbed in part; and a certain number of cases of the spontaneous absorption of senile cataract are on record . . . . but the numerous cases which have been reported, especially during the last twenty years, show that the alkaline treatment of senile cataract has been used successfully, and that the results are not due to spontaneous absorption, nor to the clearing of vitreous or fundus opacities.

"(2) Since early treatment is now recommended in general medicine as the proper treatment for every type of disease, the early medicinal treatment of cataract, therefore, should be tried in all cases, and, if possible, the patient should not be told of the existence of the cataract, to prevent worry becoming an element in the case."

Briefly, Pollock's present cases are as follow:

(1) Female 48 years. Corrected vision 6/6 in each eye. Peripheral striae in each eye, reaching into the pupillary area. Treatment by sodium acetate, citrate and chloride lotion, and Trunacek's solution in drops. A year later both lenses almost completely cleared.

(2) Male, 65 years. Vision 3/60 and 6/60. Cataract projecting into pupil in both eyes. Eyes otherwise normal. Treatment practically as in Case 1. Four and a half years later vision 4/36 and 6/24. "Cataract greatly improved in both eyes."

(3) Male, 64 years. Vision 4/12 and 4/18. Cataract reaching into pupillary area in both. Macular disease and pallor of discs from optic neuritis. Same treatment plus fibrolysin drops. Three years later vision 6/18 and 6/18. Cataract now out of the pupillary area.

(4) Male, 70 years. The right eye showed corneal opacities and cataract, and had had an optical iridectomy performed, probably for the corneal opacities, 50 years previously. Vision fingers at three feet. Left eye, vision 1/60, cataract projecting into the pupil. Treatment by sodium acetate, citrate and iodide in lotion, with Trunacek's solution in drops. Four years later vision 6/36 and 6/24. In the right eye both cataract and nebulae had cleared up to a great extent, while the cataract in the left eye had almost disappeared.

(5) Male, 73 years. Vision 6/36 and 2/60. Corneal nebulae in both; cataract projecting into right pupil and filling left pupil area. Treatment as Case 1. Four years later vision 6/18 and 2/36. Lenticular opacity entirely cleared from right eye and nearly so from left.

(6) Male, 61 years. Vision 6/60 and 6/60. Cataract into pupil area in each eye. Eyes otherwise normal. Treatment by sodium acetate, citrate and chloride, changed a year ago (in accordance with the work of Burge, *Arch. of Ophthal.*, 1909) to the potassium salts. Trunacek's solution in drops, and later, "fibrolysin injection" m.vii to m.xlv in two drachms of water. Nearly five years later vision 4/24 and 4/18. Cataract greatly improved in both eyes, but a slight relapse during the last three months.

The "fibrolysin injection" referred to is, according to a previous mention of it, Merck's, and the reviewer presumes, though it is not stated, that it is as here prescribed as drops. The author does not anywhere inform us of the exact composition of the alkaline drops employed, nor does he give the formula of Trunacek's serum. The composition of Trunacek's serum was given to the reviewer by Messrs. Martindale about thirteen years ago, and it is well that it should be known.

Sodium sulphate, 44; sodium chloride, 492; sodium phosphate, 15; sodium carbonate, 21; potassium sulphate, 40; water q.s. to make 10,000.

ERNEST THOMSON.

(2) **Taylor, Inglis (London). — The Medical Treatment of Cataract.** *Lancet*, April 5, 1924.

(2) **Taylor** refers to the work of Badal and L. Dor, and especially to that of Dor, on the medical treatment of cataract by means of chloride of calcium and iodide of sodium. An abstract of Dor's article in *La Clin. Ophtal.* for June, 1919, will be found in this journal for April, 1920. The ointment of calcic-alkaline iodide brought out by the Blache Laboratories to replace the bath recommended by Dor has been freely tried by Taylor. This ointment is quite painless in use. Taylor only claims that the treatment has value in early cases. He indicates that he has lost a number of his cases from observation owing to the want of faith of the medical profession, ophthalmic and otherwise. He is, however, strongly in favour of the treatment and gives some details of seven cases in all of which improvement in vision took place. In no single case, however, does the author state anything more than the visual acuity. He does not give any record of the ophthalmoscopic appearances or of other examination of the lenses subsequent to the treatment.

This failure to state the condition of the lenses after treatment is quite easily understood. One naturally does not wish to dilate pupils unnecessarily in cataract patients and from the clinical, as opposed to the scientific point of view, one is justified in being content with good visual results. If the reviewer may be allowed to criticise the method on another ground, it is that as applied to very early cataract which may after all turn out to be only very slowly progressive, it probably involves not only telling the patient that he has cataract when, on general grounds, it might be better not to mention it; but also involves drawing his constant attention to it by the fact of treatment. The point is arguable but seems worthy of consideration.

ERNEST THOMSON.

(3) **Darier, A. (Paris). — Methods of biological treatment. Parenteral injections of milk to stimulate the general defences of the organism (colloïdoclasic shock). Autohaemotheraphy. Paraspecific vaccinotherapy and serotherapy. Phako-anaphylaxis. (Des médications biologiques. Les injections parentérales de lait comme stimulants des défenses générales de l'organisme (choc colloïdoclasique.) Autohémothérapie. Vaccinothérapie et sérothérapie paraspécifique. Phako-anaphylaxie.** *La Clin. Ophtal.*, March, 1923.

TRANSLATION (*Abridged*).

Parenteral injections of milk, of proteins and of colloidal agents, with their sometimes astonishing therapeutic results in a host of quite dissimilar morbid manifestations, open new visions of the reactions of the organism under the influence of medicinal agents.

The discoveries of Pasteur directed our therapeutic efforts towards the antiseptic action of drugs, and afterwards towards sera and specific vaccines. Nowadays asepsis reigns supreme, and the ancient "natura medicatrix" becomes the principal factor in the return to health.

All clinicians are agreed that our efforts should be directed especially to the stimulation of the natural defences of the organism by means of all those biological agents which have been put at our disposal by the most recent experimental investigations.

We are beginning to understand how the organism defends itself from its enemies: microbes, toxins, and other antigens which have penetrated its tissues. We used to say that it was a question of the formation of antibodies, of lysins, of precipitins and so on. We say to-day that the introduction into the circulation of all foreign substances causes a blood disturbance which is characterized especially by marked haemolysis (haemoclasis of Widal), a flocculation of albumens and colloids (colloïdoclasis of Lumière). Weichardt considered it as a *suractivation des protoplasmas*. Bier, basing on the theories of Virchow, saw in it only a simple irritative process, a stimulation of all the cells and liquids of the organism: which brings us back to the *médication perturbatrice* of Trousseau (*médication catastrophante* of Béclère).

One thing is certain, namely, that after a parenteral injection of albumen or colloid there is a more or less marked febrile reaction which is characterized by an at first indefinable malaise, occasionally by shiverings, headache, quickening of the pulse and respiration, and, finally, after several hours by an elevation of temperature to 39 or 40 degrees C. A free perspiration and a good sleep end the crisis in less than 10 or 12 hours.

Very much in the same way our organism reacts to the invasion of the virus of malaria inoculated by mosquito bites. Who knows whether an injection of milk every two or three days would not prevent the subsequent paroxysms, especially if quinine administration were alternated with the milk in a predetermined manner. And, since we have in our hands the power of bringing about with certainty this reaction of defence against infections we may hope to practise on a scientific basis what our fathers called abortive treatment. When faced by a quite early acute infection in an individual who has been put into a lowered state of defence by the suddenness of the infective attack a good "stroke of the whip" to the organic defences may cause a salutary reaction which, if it is early and energetic enough, may quite well throttle the infective process. That is what the clinicians of old endeavoured to do with sudorifics, purgatives and emetics, etc. But to-day we have a better thing in proteinotherapy with its marked phagocytosis and its protoplasmic and humoral superactivation, accompanied also as it is by marked increase in the nitrogenous elimination which takes place even in the absence of all febrile reaction.

Similar reactions may be observed with substances other than the albumoses. Colloidal metals, turpentine, iodine, hypertonic saline, and even distilled water are capable of causing haemoclasis by simple destructive action on the red and white blood corpuscles. This lysis liberates globulin which, broken up in this way, acts as a foreign albumen. We are, in fact, carrying out a kind of active immunization which corresponds to vaccinotherapy. Moreover, many authors consider that vaccines (antityphoid, antituberculous and others) only act by means of the albumoses they contain. That is going rather far perhaps, but there is some truth in it, for the violent reaction which is produced by an antityphoid vaccine has been made use of in a host of affections which have nothing to do with Eberth infection.

If we wished to name all the affections which have benefited by injections of milk we would be obliged to pass under review the whole of medical and even of surgical pathology.

Dealing with *diseases of the eye,* which have opened the way to protein therapy, we should note in the first place the specially sedative action which we have already put on record as following injections of antidiphtheritic serum (Darier, "Vaccins et sérums dans la pratique journalière," Paris, Doin, 1912), which has led us to say that in ocular infections accompanied by violent pain, an injection of serum has an analgesic action more lasting than that produced by an injection of morphin. Well, one sometimes finds this same fact after an injection of milk. As contrasted with the injection of serum, which, as a rule, is accompanied by neither

pain nor reaction, the injection of milk is painful enough, and has no therapeutic action except it be accompanied by a well-marked febrile movement. But euphoria is much less marked after injections of milk than after injections of sera.

It is especially in iritis and other infective, inflammatory intra-ocular conditions, that injections of milk have given the most brilliant successes.

[Here follows a page of details relating not only to diseases of the eye but to those of the skin, to gonorrhoeal rheumatism, pulmonary tuberculosis (milk contraindicated in febrile forms and when there is haemoptysis), to influenza with its complications, to syphilis and to severe anaemias. Typhoid fever, scarlet fever, smallpox and measles have still to be studied.]

The technique. Cow's, goat's, or ass's milk is twice boiled for three or four minutes. It is then filtered, or, more simply, the syringe is filled by drawing the milk through some sterile cotton wool on the end of it. A platinum needle, flame-sterilized on each occasion, is employed. The site in the loin or buttock where the puncture is to be made is treated with tincture of iodine, and the injection is placed beneath the adipose layer or in the muscle itself. The dose varies from 3 to 10 c.c. for adults and from 2 to 5 c.c. for children. The patient must be warned that there will be a feverish attack in four or five hours; and at this time he should take his temperature, for upon this depends the succeeding dose. In a general way there ought to be a rise of temperature to 39 degrees C., if the treatment is to be efficacious. The injections are rather painful. Sometimes the limb is benumbed for several hours, and, in some patients there is a feeling of bruising and stiffness. In making the injection the region of the sciatic nerve should be avoided. An attempt has been made to give a constant chemical constitution to milk under the terms *aolan, caseosan, ophtalmosan,* but none of these products are better than boiled milk, and do not protect, any more than milk, from abscess in some subjects, which abscess is rare enough in any case.

Autohaemotherapy has been of much service in many affections. It is so easily carried out and so harmless that it cannot be too highly recommended to all practitioners. Shock or anaphylaxis are never observed, and the injections are much less painful than those of milk. The simplest method is as follows. A bandage or a handkerchief is tied well above the elbow so as to produce a good engorgement of the veins. The most prominent vein is punctured under careful aseptic precautions and the blood aspirated into a 5 to 10 c.c. syringe, and then immediately injected under the skin of the abdomen or buttock. There is no rise of temperature and no malaise. At the most there is a little local pain. The blood injected under the skin acts as a foreign albumen

but with almost no colloïdoclasic shock. According to Ramond the antigens contained in the patient's blood would more easily form antibodies in the tissues than in the blood stream. The haemolysins, especially, are developed freely around the site of the injection. One may find in this fact a valuable therapeutic indication for bringing about resorption of blood effused into the tissues, as in the case of haematomata, haemorrhagic foci, vitreous, sub-retinal and subconjunctival haemorrhages, etc. The haemolytic action may be increased by adding an equal quantity, or double quantity, of distilled water to the blood, but in that case the colloidal shock is greater and smaller quantities of blood must be injected. (Descarpentries) . . . . This autohaemotherapeutic action would seem to prove the value of dry cupping in many affections.

Autoserotherapy would seem to act almost in the same way. Serum from the pleural, abdominal and spinal cavities, or simple serum from a blister produced by the use of a vesicatory have given, in the hands of numerous authors, therapeutic results worthy of the attention of the practitioner. These sera injected under the skin or conjunctiva appear to act at one and the same time as stimulants of the defensive mechanism of the organism and as specific antigens, like immunizing autogenous vaccines (*comme stimulants des défenses organiques et comme antigènes spécifiques, comme vaccins autogènes immunisants*).

[In the next section the author deals with vaccines. He points out that these have perhaps been slightly "overdone." The difficulty often is to obtain the right material for the preparation of an autovaccine. It may be impossible as in the case of iritis, irido-choroiditis, exudative retinitis. Resort must be had to stock vaccines (polyvalent), and the bacteriological diagnosis has to be made by the ensemble of clinical signs. Paraspecific serum therapy (see various abstracts in this journal of Darier's work) should not be forgotten when we have to wait for a bacteriological diagnosis.]

Phako-anaphylaxis. Wounds of the lens may be complicated by inflammatory reactions which Lagrange and Lacoste were the first to attribute to the irritating action of the lens substance itself. Does this mean that in such cases there is an anaphylactic hypersensitivity to lens proteins? Experiments on various animals allow the statement to be made that this reaction may be denominated *phakoanaphylactic endophthalmia.* This hypersensitiveness is an individual characteristic and is rather rare. In cases where it is possible to be sure in advance that there will be abundant lens masses after operation on an incompletely cataractous lens (congenital cataract, incipient cataract, and more especially in phakolysis for high myopia), would it not be

advantageous to prepare the patient by subcutaneous injections of lens proteins or of sera of animals immunized against these substances? It would perhaps be possible in this way to prevent phakoanaphylactic reactions while at the same time assisting the phakolysis.

ERNEST THOMSON.

II.—OPERATIONS

(1) **Lagrange, Prof. (Bordeaux).—The surgical treatment of paralytic strabismus. (Traitement chirurgical du strabisme paralytique.)** *La Clin. Ophtal.*, September, 1923, and *Arch. d'Ophtal.*, May, 1923.

(1) **Lagrange** discusses the operative treatment of paralytic strabismus. The question of the benefit to be derived hangs upon the answer to the question whether we can place the deviated macula opposite the object fixed by the sound eye. This answer is that we can do so in most cases. Only those who have no inclination (*appétit*) for binocular vision will remain unimproved. There are two classes of cases, namely, where the muscle is paretic and where it is paralytic. The treatment is different in the two cases, but the object is the same, to obtain immediately after the operation an over-correction so that a homonymous diplopia becomes crossed or a crossed diplopia homonymous. For example, in paralysis of the right internal rectus with crossed diplopia the eye should be in adduction after the operation: the adduction should be slight, so that the images are near one another, and so that a small effort on the part of the normal external rectus will place the macula opposite the object fixed. Diplopia can thus be avoided by a moderate effort on the part of a healthy muscle. Before operating one should make sure that the false image is distinctly seen and if the patient is seriously inconvenienced by it so much the better. Next, as to the operative method in the two classes of cases. (1) If the muscle be merely paretic and possessed of a considerable portion of its normal power an advancement alone should suffice. If necessary the corresponding muscle on the opposite side may also be advanced. The condition required for simple advancement on one or both eyes is that the affected muscle must have sufficient power to combat the tonus and contraction of a vigorous antagonist. (2) If the muscle be completely paralytic it is usually impossible to obtain over-correction by advancement. One must tenotomise.

The tenotomy must be free enough to cause the eye to deviate in the opposite direction. At the same time the paralysed muscle and capsule are to be advanced to as great an extent as possible. No doubt this lessens the field of fixation, and if practised for

functional strabismus entails a danger of producing a squint in the opposite sense. In paralytic strabismus we have not the same fear of this occurrence. As to the reduction of the fixation field it is a small impairment which ought not in any way to frighten the operator.

ERNEST THOMSON.

(2) **Wolff, Julius (New York).—A conjunctival apron or safety flap in cataract extraction.** *Arch. of Ophthal.*, November, 1923.

(2) In consequence of the uncertainty of obtaining a good conjunctival flap in cataract extraction **Wolff** has devised the following technique:

Two points are taken which include between them the upper fourth of the limbus. From each of these a horizontal incision 2 mm. long is made through the conjunctiva and, from the ends of these, diverging oblique incisions are made, one upwards and nasally, the other upwards and temporally. The flap thus outlined is undermined, keeping close to the conjunctiva and is detached from the limbus. It is then drawn down over the cornea (if necessary it is loosened further) until its lower margin will reach two points bounding the inferior fourth of the limbus without much traction.

A suture is now passed through the temporal corner of the flap and through a point in the episcleral tissue, bounding the temporal end of the inferior fourth of the limbus. A similar suture is inserted on the nasal side. The sutures are left loose and the flap pushed up out of the way.

Extraction is now performed in the usual manner making the incision through the limbus. At the conclusion of the operation first one suture and then the other is knotted bringing the flap down into place and covering the whole incision and the upper half or two-thirds of the cornea.

The sutures are usually removed on the fourth or fifth day, and the flap soon draws back into place so that when the patient is ready to leave hospital all evidence of its presence has disappeared.

More than fifty cases have had this form of operation. The anterior chamber usually begins to re-form while the patient is still on the table. There have been no instances of filtering scars or delayed union, and no case where there has been any evidence that the wound failed to become permanently sealed up in the first few hours. The iris in each case maintained the position into which it was put at the conclusion of operation.

Wolff believes that the visual results are better than they would have been on the average without the use of the safety flap.

F. A. WILLIAMSON-NOBLE.

(3) **David, J. (Tiberias).—A radical operation for trichiasis of the upper eyelid. (L'opération radicale du Trichiasis de la Paupière supérieure.)** *Arch. d'Ophtal.*, December, 1923.

(3) **David,** who is in charge of a hospital by the Sea of Tiberias, and, therefore, has probably had many opportunities of dealing with trichiasis following trachoma, describes a method of operating for the radical cure of this condition which appears to be in some respects an improvement on the older and widely-known procedures. It is not unlike the operation advocated by Panas, at least in the first steps; but, and this feature is emphasized by David, there is no interference with the cutaneous surface of the lid and consequently no visible scar.

David's description of his operation is easy to follow with the aid of the six diagrams which accompany it; although the want of drawings renders the word-picture less satisfying it will probably prove an adequate guide to those who desire to perform the operation. The description runs as follows:

(*a*) Local anaesthesia by means of cocain or novocain usually suffices. This should be injected subcutaneously along the whole length of the upper edge of the tarsus. Then, everting the lid, a few drops are injected into the upper conjunctival cul-de-sac. With the lid still everted a spatula is introduced under the skin surface, the ciliary border of the lid seized with forceps or hook and the two instruments given to an assistant.

(*b*) Two millimetres from the ciliary border an incision is made along the whole length of the tarsus and through its whole thickness as far as the subcutaneous cellular tissue. The portions of the tarsus above and below this incision are then freed from the skin by dissecting between these structures with scissors. Haemorrhage usually occurs at this stage but can be easily arrested by pressure.

(*c*) Sutures should now be inserted. Three threads each with two needles are required. Holding the upper tarsal flap with forceps one needle is introduced close to the edge of the incision, at its nasal end. The needle emerges in the space formed by dissection between the tarsus and the skin: it is re-introduced beneath the lower cut edge of the tarsus and the skin and brought out on the lid margin in or just anterior to the line of the eye-lashes. The other needle on this thread is entered at a point two millimetres from its fellow and follows a similar course to the lid margin. Of the remaining sutures one is passed similarly at the midpoint of the tarsus and the other near the temporal end. The three stitches are then tied sufficiently tightly to produce a moderate degree of ectropion. The threads are cut 1 or 2 centimetres from the knots, a bandage is applied and changed once daily. The sutures are removed about the third day.

J. B. LAWFORD.

(4) **Wilder, W. H. (Chicago).—Some observations on iridotasis in the treatment of glaucoma.** *Jl. of Amer. Med. Assoc.*, December 22, 1923.

(4) **Wilder** has used this method of operation in a considerable number of cases of glaucoma both acute and chronic. The fact that it is essentially an incarceration of iris in a wound, does not appear to him to have any objection, though he says that "further experience and pathological examination will enlighten us on this point."

He thinks it as good as any form of sclerectomy, in the treatment of chronic glaucoma, and preferable in cases where there is known to be high blood pressure and disease of the arterial walls, since in these cases the fragile iris vessels are likely to give way and bleed excessively when any cutting operation involves the iris. On the other hand, it is unsuitable for use where there is commencing cataract, since the displaced pupil will make extraction more difficult.

H. GRIMSDALE.

III.—GENERAL DISEASES

(1) **Uhthoff, W. (Breslau).—Contributions to the study of the disturbances of vision and ophthalmoscopic changes in anaemia. (Beiträge zur den Sehstörungen u. Augenhintergrundsveränderungen bei Anämie.)** *Bericht. der deutsch. Ophth. Gesellsch.*, 1922.

(1) **Uhthoff** records the case of a man *aet.* 51 years, in whom continued intestinal haemorrhage was followed by bilateral symmetrical inferior hemianopsia with partial atrophic pallor of the upper half of the optic disc and distinct contraction and irregularity in the calibre of the upper branches of the retinal artery. This permanent result is held to be due to a direct temporary obstruction of these vessels, such a cause being exceptional in the usual cases of amblyopia after haemorrhage in which a bilateral symmetrical disease of the optic nerve must be presumed. In the absence of any pathological changes in the heart and circulatory system this obstruction is most probably one of thrombosis due to injury of the endothelium of the vessels through the anaemia and to a lowering of the blood-pressure.

The author then describes experiments made with a view to determining the maximum amount of blood that a person may lose and still survive: they were made on dogs, and he watched the ophthalmoscopic changes that attended the progressive loss

of blood. He found that after half the total amount of blood had been abstracted an initial marked contraction of the retinal vessels and pallor of the optic disc were followed by a temporary partial recovery, which gave place to a variation in the degree of pallor of the disc and filling of the vessels that depended on variations in the blood-pressure. This variation continued as still more blood was lost, but when two-thirds of the blood total was removed the anaemic changes in the fundus ceased to show any alteration and the general condition of the animal became very critical.

These findings as to the limit of haemorrhage and the accompanying ophthalmoscopic changes he considers are probably approximately the same as would obtain in man.

He further describes the fundus changes observed in two patients after clamping or division of the optic nerve immediately behind the globe, and in the almost immediate contraction of the retinal vessels and the absence of ischaemic opacity of the retina he contrasts the conditions found in obstruction of the central artery.

Finally, reference is made to the transparent appearance of the venous blood column on the disc that is seen in chlorosis when the haemoglobin content falls below 50 per cent., and disappears as it returns to this limit—thus affording an ophthalmoscopic index of the amount of haemoglobin.

THOS. SNOWBALL.

(2) **Roberts. W. H.—Increase of hyperopia in diabetes.** *Amer. Jl. of Ophthal.*, Vol. VI, No. 4, April, 1923.

(2) This paper is based on the author's thesis as a candidate for membership of the American Ophthalmological Society; the full text will be found in the Transactions of that Society, Vol. 18, p. 408. The present paper is mainly concerned with an account of five cases of this rare complication of diabetes.

Of these cases, four occurred in women, and the ages varied between 51 and 66; one case showed signs of old choroido-retinitis, but in the others the fundus was normal, and all, save one, obtained full vision with the subsidence of the hyperopia. The author quotes Joslin of Boston as saying that the explanation is connected with the marked changes in the percentages of sugar and salt in the blood. Four of the author's cases noticed the loss of vision coincident with the diminution or disappearance of the sugar from the urine. Other authors have made the same observation. **Roberts** holds that the increase of hyperopia in these cases is not due solely to lens or vitreous change, but to a combination of the two, caused by a lessening of the amount of sugar and salt in the blood and an alteration in the blood volume.

R.R.J.

(3) **Hardy. W. F. (St. Louis, Mo.).—Lipaemia retinalis, effects of insulin.** *Amer. Jl. of Ophthal.*, January, 1924.

(3) **Hardy** records a case of diabetes, aged 23 years, which was admitted to hospital in February, 1923, *in extremis*. On admission, the man was in a state of coma, with a strong smell of acetone in the breath. A specimen of blood centrifugalized showed the test tube half filled with fat, indicating a marked lipaemia; the CO_2 volume per cent was less than ten. The media were clear, there was some retinal oedema and the disc and vessels appeared of the same colour, no differentiation being possible between arteries and veins, the light streak was absent. The vessels looked as if filled with malted milk. Thirty-three units of insulin were given immediately after admission, and by the next day the retinal oedema had disappeared and the disc and vessels were well defined; the lipaemia was still present. Insulin was given daily and after two days the fundus appearances returned to normal.

The author states the facts in reference to diabetes, acidosis and lipaemia. "A close relation exists between acidosis and CO_2 output. According to Allen, the lowering of the CO_2 carrying power of the blood indicates a late severe stage of acidosis. Every case of diabetic acidosis is not necessarily accompanied by lipaemia, but it may be said that virtually all cases of marked lipaemia show an acidosis."

In the present case the blood fat was estimated at 4.5 per cent.; fat is normally taken up by the tissues as fast as it is absorbed into the blood. The lipaemia of diabetes represents an accumulation of food fat, resulting from the tissues failing to take up and dispose of it in the usual manner. In fasting the blood plasma contains about 0.7 per cent. of total lipoids; and at the height of digestion the lipaemia is between 1 per cent. and 2 per cent., mostly in the dissolved form. The author's impression was that a considerably higher percentage of fat in the blood was necessary before the fundus picture of lipaemia made its appearance; "if the laboratory findings in this case are correct the true threshold must be placed between 3 and 4 per cent."

R.R.J.

(4) **McCann, W.—Lipaemia retinalis.** *Bull. Johns Hopkins Hosp.*, Sept. 1923. Reviewed in *Jl. of Amer. Med. Assoc.*, Dec. 29, 1923.

(4) **McCann** believes the condition to be much more common than one would suppose from the infrequency of the reported cases. He does not believe that the retinal appearance is due to an excess of fat in the blood alone, as lipaemia may persist after the retina has assumed a normal appearance. McCann believes that when

the vessels appear whitish, fat may become deposited in their adventitia, or they may become surrounded by a lymph rich in fat so that light is abnormally reflected or refracted. Possibly too the state of aggregation of the fats and lipoids in the blood may have more to do with the appearance of the retina than does the total lipoid content.

E. R. CHAMBERS.

(5) **Riddell, Brownlow (Glasgow).—The early ocular manifestations of disseminated sclerosis.** *Glasgow Med. Jl.*, December, 1923.

(5) In this article, which contains a number of particularly interesting histories of cases which have come under the author's observation, **Riddell** insists on the importance of the early and often fleeting ocular symptoms of disseminated sclerosis. The following quotation shows the author's standpoint and indicates his views, for a full appreciation of which it is necessary to consult the case histories given. "If a patient complains of indefinite eye symptoms (and the description is frequently very vague indeed), and if in the course of a few weeks the same patient feels perfectly well, it is the easy way out to rest content and to look upon the symptoms as having been functional, hysterical, or digestive. If, therefore, at a later date other symptoms manifest themselves . . . . one would be forced to the conclusion that the original 'idiopathic' diagnosis was not, strictly speaking, correct. The case may have been diagnosed from the eye point of view as being one of retrobulbar neuritis, or diplopia. It runs a limited course and the patient makes an 'uninterrupted recovery.' Is this so? May there not be a variable, and even prolonged, period of freedom from symptoms, and at a later date definite evidence of organic disease of the central nervous system."

ERNEST THOMSON.

(6) **Corbin, J. (Adelaide).—Exophthalmic goitre treated with quinidin as a pre-operative measure.** *Med. Jl. of Australia*, February 2, 1924.

(6) **Corbin** reports a case of exophthalmic goitre which occurred in a soldier returned from the war. He was asked to see the man with the view of performing an operation for removal of part of the thyroid gland, but on examination, the general condition was found to be so bad that radical operation offered practically no hope of success. A course of quinidin was given instead. The initial dose was 0.3 gramme thrice daily, increasing by 0.15 gramme daily until 2.1 grammes were being taken during the day and then reducing at the same rate. The course of treatment produced no sickness, giddiness or headache, while there was a

marked improvement in the general condition. The man was next allowed up, and digitalis and iodide of potassium were given, but all his symptoms rapidly returned. A second course of quinidin was given, but the improvement was not so great; later, a third course was given with much improvement. The man's general condition was now so good that it was decided to operate. A large part of the gland was removed, the patient bore the operation well and made an uneventful recovery. When last seen, there was no exophthalmos and no tremor, the pulse rate was much slower and the man was gaining weight and strength. Before the administration of quinidin the man appeared to be nearly a "hopeless risk" for operation.

R.R.J.

(7) **Wagener, Henry P. (Rochester).—Retinitis and renal function in cardiovascular renal disease.** *Amer. Jl. of Ophthal.*, April, 1924.

(7) **Wagener's** paper is based on an examination of 80 cases which are placed in four groups:

1. Those in which retinal haemorrhages occur in association with retinal arteriosclerosis, but without retinal oedema or exudates. In this group it was rare to find lowered renal function.

2. Arteriosclerotic retinitis. Here, in addition to haemorrhages, the familiar small bright white spots occur, usually grouped around terminal arterioles, especially in the macular region. Also, there may be proliferation of new vessels where an artery has been completely or partially obliterated. This form is regarded as due to a severe endarteritis by no means typical of, or necessarily associated with nephritis. In confirmation of this, it was found that this form of retinitis was seldom associated with retention of nitrogenous waste products, but the ability to excrete phenol-sulphonaphthalein was usually reduced, owing possibly to arterio-sclerotic changes in the kidney.

3. Retinitis of hypertension plus nephritis. Here there are also some cotton wool patches present, and the arteriosclerosis is often of moderate or slight degree. It is not often associated with permanent reduction of renal function, though it may indicate temporary renal insufficiency with a capacity for rapid return to normal.

4. The retinitis of nephritis. Here there are haemorrhages, marked oedema, swelling of the disc, with perhaps localized patches of increased density and often a macular star. These may occur without previous retinal arteriosclerosis.

This type was found to indicate, in cases of chronic glomerular nephritis, a progressive renal insufficiency. It was, however, also

found with functionally normal kidneys in patients with "malignant hypertension."

The paper contains two tables giving details of the 80 patients and concludes with the following bibliography.

1. **Benedict, W. L.**—"Retinitis of hypertension plus nephritis. *Trans. Sec. Ophthal., Amer. Med. Assoc.*, pp. 33-43, 1922.
2. **Moore, R. F.**—"The retinitis of arteriosclerosis and its relation to renal retinitis and to cerebral vascular disease." *Quart. Med. Jl.*, Vol. X, pp. 29-78, 1916-1917.
3. **Shaw, H.B.** "Hyperpiesia and hyperpiesis." London; Frowde, Hodder and Stoughton, pp. 95-97, 131, 178, 1922.
4. **Volhard, F.**—"Die doppelseitigen hämatogenen Nierenerkrankungen." Berlin, Springer, p. 557, 1918.

F. A. WILLIAMSON-NOBLE.

IV.—SPECTACLES

Roesen, Alexander (Freiburg, i. Br.)—The Geaphot-filter spectacles. (Das Geaphot-Brillenfilter.) *Arch. f. Augenheilk.*, Vol. XCII, March, 1923.

F. Leiber, the technical director of the Geaphot Company of Freiburg is the inventor of this filter. Some 14 years ago he started experimenting to find out if and to what extent the definition of distant objects could be increased in photographs. The experiments led to astonishing discoveries. During the war his research made further progress and was widely used with excellent result. It is based on the knowledge that the longer the wave-length of the rays of light the more unhindered they penetrate the atmosphere, and conversely, the shorter the wave-length the more the rays are subject to diffuse reflection. According to Rayleigh the diffuse reflection of a ray of light is inversely proportional to the fourth power of its wave-length. Accordingly the plates are so made that their maximum sensitization is placed as far as possible in the red end of the spectrum, while simultaneously, violet, ultra-violet, blue and under certain circumstances green rays are either wholly or partly absorbed by the filter. The best results are obtained when only rays from the outermost red end of the spectrum are brought into use, i.e., rays from $\lambda=700\ \mu\mu$ upwards. Distant objects which are ordinarily either invisible or only dimly visible become defined when seen through spectacles of pure red glass. As regards photography red has the drawback of requiring longer exposures than can be given while flying, and in spectacles makes everything red. To obviate these drawbacks the Geaphot-filter was constructed in such a way as to let through all rays from $\lambda=650\ \mu\mu$ upwards and to absorb all rays from there downwards but for a gap left in the

absorption-area in the blue-green region (at about $\lambda=510\ \mu\mu$) of such depth and width that the blue-green rays let through mixed with the red to give a more or less neutral grey to yellowish tone. Looking through such a filter, while on the one hand one can see objects just as clearly as through the pure red, on the other, one is free from the unpleasant subjective sensations due to the red filter and gets a feeling of extraordinary restfulness of the eyes. In the modified filter not only is the uniformity of colour as seen through the red abolished, but at the same time colour perception is so accentuated that colour differences hardly noticeable to the naked eye are clearly made out. These advantages of the filter led the military authorities to carry out with the co-operation of Leiber exhaustive experiments and trials. It was found very difficult to make glass of the required Geaphot tints but that they could be easily produced through coloured colloid films. Hence all the spectacle-filters were made of so-called triplex glass—this is nothing more than two plates of glass stuck together with a layer of celluloid—with correspondingly coloured colloid films sandwiched in between. After the experiments were brought to a satisfactory conclusion, in 1917 the German air-force was provided with Geaphot-filter spectacles. In the further course of the war special tints for particular needs were worked out so that finally there were ten different tints ready for use, among them special filters for the observation of clouds, for illuminating search-light service (*Scheinwerferbedienung*) and for the better recognition of muzzle fire (*Mündungsfeur*).

To explain how the Geaphot-filter produces such advantages Leiber discusses here the kind of rays that reach the airman's eyes and the behaviour of rays in the atmosphere, and the difference, between direct sunlight and diffuse indirect light from the sky. He is of opinion that rays that harm the external structures of the eye are different from those that affect the internal structures.

To the above extract from Leiber's writing **Roesen** adds an account of numerous further experiments to find out to what uses the filter could be put other than those mentioned above. It is found particularly useful for winter sports, mountaineering, water-sport (*Schnee-Hochgebirgs und Wassersport*), hunting, etc. In certain industries it is very helpful. In working with quartz-lamps in autogenous welding (*Autogene Schweissen*) and in glass-blowing, the darkest filter gives excellent protection against glare and irritation in the form of electric ophthalmia. It has been found to have several advantages over the ordinary grey, green or blue glasses hitherto in use for protecting the eyes of patients undergoing quartz-light treatment (*Quarzsonne*). The filter enables the patient to keep the eyes open in comfort; not only this, but it also enables the patient to see the surrounding faces and things practically in their normal

complexion and colour. The Geaphot spectacles are also very helpful to sufferers from glare be they invalids or healthy individuals, particularly because of objects appearing in their normal colour as seen through them and because of one's being able to meet the wishes of the patient as regards the tint he favours for the filter. By accentuating differences of tone and saturation (*Helligkeit und Sättigung*) they help the colour-blind to appreciate the outer world better. They are of importance to railway and marine engine drivers with normal colour vision as they enable them to recognize signals better in damp and foggy weather.

This paper has been abstracted at some length as the subject is of practical importance and makes interesting reading.

D. V. GIRI.

V.—MISCELLANEOUS

(1) **Koeppe, L.—Observations in Spain with the slit-lamp. (Ueber Spaltlampenbeobachtungen in Spanien.)** *Zeitschr. f. Augenheilk.*, November, 1921.

(1) **Koeppe** here records some of the observations that he made during a course of lectures that he gave in Madrid, Seville, Granada and Murcia.

Several cases of iritis, including many examples of tuberculous iritis, were examined. Nodules in the neighbourhood of the pupil margin, and especially precipitates upon the posterior surface of the cornea taking the form of nodules, stars, threads and aggregations of lymphocytes, are characteristic of the tuberculous form. The last appear as small, round, sharply defined discs both on the corneal surface and free in the aqueous, and are quite different to the more diffuse, bent discs of fibrin particles. Koeppe's earlier observations were confirmed and amplified in Spain, although Vogt is not in agreement with them. He satisfied himself that the bedewing of the posterior surface of the cornea (*Betauung*) is not, as Vogt thinks, caused by swelling of the endothelial cells, but is caused by cellular deposits.

Early and late examples of contusion of the bulb came under review and Koeppe confirmed the observation, one agreed to by Vogt, that fresh erythrocytes floating free in the aqueous and the vitreous can be seen as well-defined orange-red discs.

The phenomenon of the heat-eddy in the anterior chamber was constantly observed. Under the influence of the slit-lamp ribbon of light the movement becomes more rapid. The acceleration is at first slight but rapidly increases up to a definite extent.

Examples of keratitis vesiculosa externa were seen. The corneal surface was covered with fine vesicles of varying size. These could be localized with ease, and differentiated from particles from the conjunctival sac, and also from deposits upon the posterior corneal surface.

There was a case of keratitis associated with acne rosacea. In both eyes, which were slightly injected, Koeppe found numerous polyform defects of the corneal surface, with slight inflammatory infiltration of the underlying stroma. The defects shone with a peculiar sheen, suggesting fish scales. In addition there were small localised sub-epithelial infiltrations without any surface breach. This condition has so far not been described, and Koeppe suggests that there may be a definite *rosacea keratitis*, but he will not go so far as to state that it is present in all cases. The keratitis was of short duration, and when the acne improved it disappeared, leaving an evanescent epithelial haze.

Observations were made upon the normal cornea in the region of the lymph stomata. Not only in the limbal region but also in the more central parts of the cornea there were visible isolated net-like nodes of lymph stomata, obviously situations where the lymph channels branch, of a darker grey than is usually the case in slit-lamp observation; the underlying corneal tissue being less transparent and more "massive" than usual. This appearance was noted in several stomata in the same eye. It is suggested that there may be here a *perisclerosis* of the stomata.

Some interesting cases of healed ulcus serpens were seen. The epithelium was irregular, looking like a layer of drops, but there were no vesicles as in keratitis vesiculosa. The lymph clefts showed signs of opacity and inflammatory reaction, but the corneal lamellae between them were clearing up. Under the irregular epithelium folds in Bowman's membrane were visible, appearing as bifurcating and interlacing twigs, silver-white in appearance. The same appearances could be distinguished after operations and contusions.

In the deeper corneal layers in these cases of ulcers one saw numerous branching folds of the posterior surface of the cornea, and beneath them were grey streaks without folding. These indicate endothelial ruptures.

Some cases of glaucoma showed those typical changes in pigmentation which Koeppe has described elsewhere as characteristic of glaucoma. Retinal pigment can be detected in the iris stroma of blue eyes, especially in the sphincter region. Here and there on the iris surface there are isolated deposits of pigment. The pigment takes the form of a fine dust, and it is the intra-stromal deposit that is characteristic. Dusting of the surface is not uncommon in extreme age, and has nothing to do with glaucoma.

The appearances seen in incipient senile or complicated cataract

are very interesting. In the negative illuminated field of the slit-lamp using polarised light, the earliest signs of capsular and cortical opacities are clearly seen when the analyser is placed in its maximal position giving a green field. By turning the analyser we obtain magnificent colour effects, which confirm the view that the cataractous material has the power of double refraction.

Cases of retinal detachment with vitreous opacities showed extensive destruction of the framework of the vitreous. Clefts filled with optically homogeneous fluid were noted. The clefts were surrounded by degenerated vitreous fibres. In other cases in high myopia the vitreous had the normal structure, a fact that proves that high myopia is not necessarily associated with degeneration of the vitreous. Examination with the slit-lamp shatters the theory of Leber and Nordensen that detachment in high myopia is due to traction by vitreous bands, for bands powerful enough to effect this are never found attached to the retina. Again, one can find detachment with a perfectly normal vitreous.

A case of retinal detachment based upon a tuberculous affection of the retina showed with the slit-lamp numerous fine retinal folds, yellowish degenerative foci, and old and fresh linear haemorrhages near the retinal vessels, especially the veins.

The fine retinal haemorrhages hugging the vessels in detachment caused by periphlebitis exudativa are most interesting to observe with the slit-lamp. At the branching of the retinal veins one can see that the vessel is surrounded by a sheath on which minute tubercles can be detected. The arteries are similarly affected but less frequently.

Cases of retinitis pigmentosa were very instructive. One saw retinal atrophy with increase of the glial elements. The living vitreous was seen full of scattered pigment cells. All showed a criss-cross structure of the vitreous fibrillar framework.

Persisting and new-formed vessels were seen in the negatively illuminated field of the slit-lamp. In two cases, using the contact glass, the retina was focally illuminated, and the microscope focussed upon the posterior part of the vitreous. In the negatively illuminated red field so obtained Koeppe saw a vascularization similar to that seen in a vascularized cornea. Both patients suffered from retinitis pigmentosa.

Observations were made upon the reflex from the retinal vessels. We have been taught that this is due to the reflex from the blood column. The slit-lamp shows that this is not the case. Using a magnification of 60, the ring-like streaks of the circular muscles were obvious. Moving the arm of the lamp we can see the reflex play along these muscle rings. The reflex of the veins is associated with the tunica externa which corresponds with the circular muscles of the arteries.

Observations were made upon the changes seen in scotoma helieclipticum; these will be published by Professor Marquez.

T. HARRISON BUTLER.

(2) **Lemoine, Albert N., and Macdonald, Alex. E. (Boston). Observation on phacoanaphylactic endophthalmitis.** *Arch. of Ophthal.*, March, 1924.

(2) One hundred and sixty eight patients were tested by **Lemoine and Macdonald** for sensitivity to lens protein. It has been found that those who are hypersensitive to pig's lens protein are also hypersensitive to their own lens protein, and that desensitization can be effected. The technique of the tests is as follows:

The lens is aseptically removed from a pig's eye obtained not later than four hours after slaughter, placed between two layers of sterile cloth and allowed to dry. It is then aseptically pulverized and the powder put up in amounts of 0.03 gram. in sterile ampoules. When required for use, the contents of an ampoule are added to 1 c.c. of fresh sterile normal saline. 0.04 c.c. of this solution is then injected between the layers of the skin, and a control injection of the same amount of normal saline is also made at least 8 cm. away from the area chosen for test.

A positive reaction is shown by the occurrence of an area of erythema exceeding 3 cm. in diameter and persisting for at least 24 hours. The reaction may be delayed for 12-24 hours. An area of erythema, less than 2 cm. diameter with very little elevation at the point of injection but definitely more marked than in the control, is classified as $\pm$.

To desensitize a patient, the test is made in various dilutions, 1:10., 1:100., etc. The first desensitizing injection is 0.2 c.c. of such a dilution as will produce a + reaction. The subsequent injections are given at weekly intervals, the dose being doubled each time until 1 c.c. of the full strength solution is injected. The patient should then give a negative reaction. As the effect is not permanent the maximum dose should be given at weekly intervals after operation until practically all the cortical matter is absorbed.

The following conclusions were reached from the report on 168 patients of whom 14 were positive:

1. In none of the negative cases was there any subsequent intraocular inflammation, unless due to definite infection at the time of the operation or of the trauma to the lens.

2. Seven of the positive cases developed endophthalmitis, the severity of which was proportional to the amount of cortical matter left, and to the degree of hypersensitiveness of the patient.

3. Two hypersensitive patients were desensitized, and successfully operated on for immature cataract.

4. The test is necessary only in the following types of patients:

(*a*) Those with immature cataracts. If the test is positive they should be desensitized or operation delayed until the cataract is mature.

(*b*) Those with traumatic cataracts. Every effort possible must be made to remove the lens matter by operation.

(*c*) Those failing to develop good vision after a previous operation on the other eye, and particularly those with a history of long continued pain and redness.

F. A. WILLIAMSON-NOBLE.

(3) **Gruss, Dr. Robert.—On stovarsol.** (Zur Frage des Stovarsols.) *Wien. klin. Wochenschr.*, March 27, 1924.

(3) **Gruss** reports a case of primary chancre treated with stovarsol. When the patient was first seen spirochaetae were present in the chancre but the Wassermann was negative. In the course of seven weeks the patient was given altogether fourteen grammes of stovarsol — by the mouth. At the end of this period the chancre had healed up, but there was a generalized papular syphilide and the Wassermann was positive.

A. H. LEVY.

BOOK NOTICES

The Relative Position of Rest of the Eyes and the Prolonged Occlusion Test. By F. W. MARLOW, M.D., etc. (Syracuse, N.Y.) Philadelphia: F. A. Davis Co. 1924. Price, $2.50.

For several years past, in communications to various medical journals, the writer of this monograph has advocated the employment of the prolonged occlusion test in the examination and determination of errors of ocular muscle balance. Nevertheless, the test is, so far as we are aware, but little known or utilized in this country. In the book now before us, which is based on his experience in 700 cases, Marlow gives a clear and well-expressed exposition of his views, a detailed description of his method of examination, and the results of its employment during a long series of years. The title of the book seems open to criticism; the "Relative Position of Rest" has pride of place, but only two pages are devoted to its consideration. These two pages, however, contain statistics which are probably unique; they give the relative

position of rest of the eyes of 700 persons as determined by the prolonged occlusion test; in every case the influence of errors of refraction was eliminated. In only 24 of the whole number was the relative position of rest one of parallelism.

The prolonged occlusion test consists essentially in complete occlusion of one eye for a much longer period than is possible during a clinical examination. In the author's words: "it is nothing but a screen test extended in point of time." "Theoretically . . . . the test should last until stability in the position of rest is attained, that is until the findings are essentially the same from day to day; but as a rule a week's occlusion will furnish valuable information."

The results obtained by Marlow in his 700 cases are shown in tabular form; in table 10 there is a summary of the general results of the test, which merits attention. Of the total of 700 cases, 154 showed orthophoria before occlusion; after occlusion this number fell to 13; in percentages these figures are 22 before, and 3.4 after occlusion. These figures are remarkable and strengthen the reviewer's belief that errors of ocular muscle balance sufficient to give rise to symptoms occur with greater frequency among the inhabitants of the United States than among residents in this country. It would be interesting to know the relative number of males and females in the author's collection. The tables give no indication, but there is one statement in the letterpress which suggests that the greater number of his patients were females.

Marlow writes with the conviction of one who has tried and proved the value of this test of which we believe he is the originator. It has, he says, "yielded valuable aid in the elucidation of many otherwise obscure problems."

His arguments, coupled with the results he has obtained, shown in the tables and recorded in the letterpress, indicate clearly that his method is one deserving a careful trial by ophthalmic surgeons who are not already familiar with it.

The book is well printed, and is almost free from typographical faults. It is provided with a table of contents and an index.

The Ophthalmoscope and How to Use It, with a Chapter on Diplopia. By A. FREELAND FERGUS. London: J. & A. Churchill. 49 pages with 17 Illustrations. Second edition. 1924. Price, 3s. 6d.

We published a notice of the first edition of this book in the February number of this year. The only addition of any importance consists in a statement conveying the author's views on the more correct way of regarding minus lenses as positive and plus lenses as negative as done by physicists. We must admit

that strictly speaking this would be more correct, but we fear that the conventional use of the terms by ophthalmologists is of too long standing to be altered for theoretical reasons.

We must congratulate the author on the necessity for a second edition so soon after the first, as this must indicate that the book has been found to supply a want.

CORRESPONDENCE

MINERS' NYSTAGMUS

To the Editor of THE BRITISH JOURNAL OF OPHTHALMOLOGY

SIR,—I am inclined to agree with Mr. A. S. Percival of Newcastle-on-Tyne that in a certain percentage of cases there is a predisposition to the disease from childhood. I am also of opinion that a condition may arise in the eye in later life which tends to induce the condition.

Appended are notes of two cases sent to me for examination on July 20, 1921, which may prove of interest.

1. Richard C., 55, coal miner, residing at Tyne Dock, County Durham. At work last on October 19, 1917. Complains of blindness, giddiness, pains in the eyes, the forehead, and back of head. Has good health otherwise. Eats well and sleeps well. Smokes two ounces of twist tobacco per week. Does not chew tobacco. Does not read. Can read a certain amount with glasses, but does not do so because of fatigue. Has slight nystagmus. Fundi healthy. Commencing cataract. Some central opacity in each lens, more dense in right one. Is hypermetropic.

R.V. 6/60 with +2D sph. 6/36.

L.V. 6/64 with +2D sph. 6/12.

In this case the nystagmus was distinctly slight. I think he probably had changes coming on slowly in his lenses for a long period. Of course, he was unfit to go to work in a mine again.

2. Thomas Y., 44, miner, Tyne Dock, County Durham. At work last in October, 1914. Complained at that time that "everything was going round and round," also dizziness. When got down the pit had to sit down for a quarter of an hour before able to see the road he had to take. Was very bad on coming out of the mine. He started work in a mine when 13 years of age, and was there until 20. After that was away from mining for 14 years and worked at filling grain and iron ore. After this he worked in a coal mine for about four years and then developed nystagmus.

He says he is a healthy man. Eats well and sleeps well. Smokes two ounces of twist tobacco per week. Does not chew tobacco.

Right Eye. He states has been defective since he was eighteen months old. Examination of the eye shows that he has had an ulcer of the cornea with perforation, there being an adherent leucoma present. Pupil inclines to pear shape, and is elongated. Right Vision—Can only see hand movements close to the face.

Left Eye. Pupil pear-shaped and elongated with narrow end downwards. I take it due probably to partial coloboma of the iris. Well marked nystagmus. What looks like remains of pupillary membrane in the pupil. Fundus looks healthy.

L.V. = 6/60 with − 2 D Sph. ⊂ − 1 D cyl. axis 150° 6/12.

This man, comparatively young, was of course quite unfit to go down a mine and always would be. I believe this man when a child had some nystagmus. At any rate he would have a marked predisposition to it because of the congenital anomaly in each eye. As I said at the time this man should never have been allowed down a mine. It was the worst possible thing for him. A case like this points to the necessity, in the interests of both employers and employees, of having the eyes of boys and men examined before they take up the occupation of working in a coal mine.

Your faithfully,

G. VICTOR MILLER.

STOCKTON-ON-TEES,
June 2, 1924.

FUTURE ARRANGEMENTS

September 1-6.—Course on the slit-lamp at the Ophthalmic Clinic of Zürich.

In answer to a number of applicants who could not be accommodated last year, Professor Vogt will hold a course in slit-lamp work, combined with demonstrations of the fundus in red-free light, from September 1 to 6, inclusive, 1924. The programme will be the same as that of last year. The number of students to be admitted to the course is limited.

Application should be made to Professor Vogt, Universitäts Augenklinik, Zürich.

October 7.—Midland Ophthalmological Society (Annual Meeting) at the Birmingham and Midland Eye Hospital.